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VIEWS, NEWS AND INTERVIEWS.

A young lady walked to the rear door of a car on the Lenox avenue underground trolley road and held out a nickel to the conductor.

"What's this for?" asked the conductor.

"My fare. I got on at Eighth avenue and 116th street. Stop here, please."

After she had alighted the conductor turned to an ELECTRICAL REVIEW man, who happened to be standing on the rear platform, and said in a surprised way:

"Durned if there ain't an honest girl." He put the nickel in his pocket and his astonishment was so overwhelming that he forgot to ring up the fare.

The central stations of Berlin, Germany, supply current to 146 motors, aggregating 546 horse-power, used in driving printing presses. In the same city 139 motors, aggregating 834 horse-power, are used in running elevators.

Dr. M. A. Veeder, of Lyons, N. Y., thinks that electric current can be generated by using the water of the Erie Canal. In an interview he is reported as saying: "In Lockport there is a fall of about 61 feet in a distance of 25 miles from Buffalo. Near Rochester there is a fall in the canal of about 40 feet at a distance of about 90 miles from Buffalo. Still further eastward there is a succession of falls in the height of the Erie Canal, the waters of Lake Erie extending to the neighborhood of Cayuga Lake, 160 miles east of Buffalo, with a descent of about 80 feet. If the waters of the Erie Canal were used for the generation of power for electric traction at the points most favorably situated throughout this section, it might prove to be economical. It certainly looks like a problem worth studying. The descent or fall between Buffalo and Cayuga Lake is greater than the fall of water over Niagara Falls, and the fall is a gradual one, extending over 160 miles."

"In New York city the traveling public has a good opportunity for a direct comparison of the overhead trolley, the underground trolley and the cable systems," remarked a metropolitan resident. "The Lenox avenue underground trolley line crosses the 125th street cable line and also the 135th street overhead trolley line of the Union Railway Company. The cable is noisy, jerky and uncertain in its operation. The overhead trolley line is fully as noisy, runs slowly and the cars are uninviting. The Lenox avenue conduit line runs quietly, swiftly when desired and the double headlights on the cars give ample warning of their approach. I and many other New Yorkers hope that the tests of the conduit this Winter will prove successful and that all the surface railways in the city will be changed over to the underground electric system."

Electricity will move all the machinery at the Paris World's Fair in 1900.

INTERIOR VIEW OF ONE OF THE NEW ELECTRIC FIXTURE SHOWROOMS OF MCKENNEY & WATERBURY, BOSTON.

A HANDSOME ELECTRIC FIXTURE SHOWROOM.

OPENING OF MCKENNEY & WATERBURY'S ELEGANT NEW STORE IN BOSTON.

McKenney & Waterbury have just issued several thousand artistic invitations to the general public and their many friends and patrons to attend the formal opening of their magnificent new showrooms and parlors at 181 Franklin street, Boston. The invitation holds good for a period of 10 days, from November 11 to 20, and there is no doubt but that it will be responded to by all interested in the artistic feature of electric lighting who are able to get there in person.

For such a treat is in waiting, as they will find displayed a line of the most advanced and artistic designs in gas and electric fixtures, whose use adds so greatly to the beautiful lighting effects of the present day.

For the benefit of those who cannot attend in person we publish on this page an illustration of one of the parlors, which will at least give a faint idea of what is to be seen.

The firm of McKenney & Waterbury was established in September, 1888, and in a comparatively small way began the manufacture of the best that was at that time known in the way of lamps and gas fixtures. Electric lighting was then in somewhat of a crude state, and fixtures

for this purpose were taken up rather as a side line.

It was not long, however, before the enterprising members of the firm realized that here was a field of development destined to outrank all the rest of their business, and they were not slow to see the advantages of being in the front rank. With a firm belief in the inherent artistic taste of the American people and their willingness to pay for the best of anything that can be produced, they spared no effort to keep abreast of the demand, and often to exceed it, in the production of something better and more artistic than was then in use.

That their efforts met with a full measure of appreciation is demonstrated in the wonderful growth of their business, which for some time past has been carried on under the disadvantage of insufficient space, and which led to the acquirement of the entire building they now occupy, and the opening of which they celebrate this month.

They have designed and manufactured some of the most striking and original features in the way of electric fixtures ever turned out, among them being the mammouth "grape vine" in the dome of Keith's new theater in Boston, which cost over $3,000. Their work in the new court house in Boston is also worthy of special mention.

The members of the firm are both young men, full of energy, thoroughly up to the times and have already succeeded in taking a front rank among the manufacturers of the country. In view of what they have already accomplished, and with the superior facilities now at hand, great things may be expected of them in the future. They mean to demonstrate the truth of their catchy motto: "We light the world."

A Storage Battery Lighting Plant for a Residence.

The Electric Storage Battery Company, of Philadelphia, has recently closed a contract for a complete electric lighting plant for Mr. Frank Thomson, Merion, Pennsylvania, vice-president of the Pennsylvania Railroad Company. The plant consists of an Otto gasoline engine, capable of giving 26 actual horse-power. The engine is belted to a four-pole shunt-wound dynamo having a capacity of 20 kilowatts.

The storage battery consists of 60 chloride accumulator elements in lead-lined tanks. These cells have a capacity of 1,000-ampere hours at a 10-hour discharge rate, but provision is made in the lead-lined tanks to double the number of plates, thereby increasing the capacity to 2,000-ampere hours. The power house and storage battery room is situated about 300 yards away from the residence, the current being conveyed by a 300,000 circular mil cable run partly on poles and partly underground. The power house has been specially designed and built for a private house lighting plant, and the whole installation will be as complete as it is possible to make it.

SOME POINTS CONNECTED WITH THE PREPARATION OF PURE IRON BY ELECTROLYSIS.

READ BEFORE THE BRITISH ASSOCIATION BY PROF. W. M. HICKS, F. R. S., AND L. T. O'SHEA, B. SC.

We have recently had occasion to prepare for a special investigation considerable quantities of pure iron by electrolysis. Although this has frequently been done before by others, we have not been able to find any published account of the details to be attended to to insure success. As the process is a tedious one, and cost us much time and trouble to discover the best conditions, it may be useful to put on record some of the difficulties met with and the means adopted to overcome them.

The most complete account of the past attempts to prepare iron by electrolysis is given by Varrentrapp (*D. P. J.*, 187-150), who describes the precipitation of iron from solutions of ferrous sulphate, with or without the addition of ammonium chloride, by means of the current from a single Daniell's cell, using iron wire as the anode.

Lenz (*Jour. fur Pr.*, 108-438) adopted Klein's process of using a solution of ferrous and magnesium sulphate carefully neutralized with magnesium carbonate. More recently, Classen, in his book, "Quantitative Analyse durch Electrolyse," describes methods for the electrolytic deposition of iron from solutions of ferrous salts containing a large excess of ammonium oxalate, and also refers to the methods adopted by Rudorf, Brand, and E. F. Smith for the analysis of iron compounds by electrolysis.

As many of the difficulties we met with are not referred to in these publications, we hope that the following notes may be found useful by those who, in the future, require to use this method.

It is generally admitted that the electrolyte should be neutral, and we found it absolutely impossible to prepare coherent masses of iron if the solution contained free acid.

The electrolyte used was a five per cent solution of crystallized ferrous chloride, to which was added sufficient ammonium chloride to form the double chloride $FeCl_2 2NH_4Cl$. Stronger solutions than this can doubtless be used, but the above strength was adopted as offering the most suitable resistance for the regulation of the current and the fall of potential between the electrodes. The amount of iron salt in solution should, however, not be allowed to get too low, because when nearly all the iron salt is decomposed the solution becomes alkaline from the decomposition of the ammonium salt, and ferrous hydroxide is precipitated by the ammonia thus set free; it may be roughly stated that the amount of iron salt in solution should not fall below from 20 to 30 per cent of its original strength. To avoid this difficulty, we adopted the plan of daily determining by titration the amount of iron removed from the solution, and adding its equivalent in ferrous chloride. As this was done by siphoning off a certain volume of the electrolyte, an amount of ammonium chloride equal to that removed in the solution was added with the ferrous chloride.

It is very essential that the solution be free from ferric compounds, for their presence seems to lead to the formation of ferric hydroxide, which settles in large quantities at the bottom of the cell, and is often deposited on the cathode, whilst considerable frothing accompanies its formation. It appears, also, that the production of ferric hydroxide ceases as soon as the whole of the ferric compound is decomposed, for in the early stages of our work we were troubled with the formation of this substance whenever we started with a fresh quantity of electrolyte, or added more ferrous chloride to replenish that in use, but after the current had passed for some time ferric hydroxide ceased to form. We effectually overcame this difficulty by shaking the ferrous chloride with reduced iron and filtering just before using. This had the effect of reducing any ferric salt to ferrous before entering the electrolyte. So long as this was done the ferric hydroxide ceased to be deposited on the plate, and the amount which was deposited at the bottom of the cell was small even after working for three weeks.

There seems no doubt that, to get the best results, both the terminal volts and the current density must lie within certain limits. This requires regulation by the resistance of the cell itself. The constitution of the electrolyte just given was found to meet the necessities of the case. Classen (*loc. cit.*) gives a density of 0.5 to one ampere per 100 square centimetres for purposes of electrolytic analysis, whilst for steel facing S. P. Thompson ("Dynamo-Electric Machinery") gives 0.5 to 1.5 ampere per 100 square inches, say 0.08 to 0.25 ampere per 100 square centimetres. We found it was desirable to strike the deposit with a current density of 0.2 ampere per 100 square centimetres, and when the cathode was completely covered to reduce the density to from 0.15 to 0.18 per 100 square centimetres. Although we found it undesirable to exceed these limits, it is possible to considerably reduce the density and we have used 0.08 ampere per 100 square centimetres with success.

The current was obtained from a single storage cell, "E. P. S." pattern, having a voltage of 2, in series with a cell of dilute sulphuric acid and lead electrodes. This reduced the voltage to nearly the right value. In some cases we used two depositing cells in parallel without the lead H_2SO_4 cell. A small external resistance then regulated the potential difference between the electrodes to about 0.7 volt.

The cathode was a sheet of the thinnest copper procurable, stiffened by mounting on a sheet of glass. In connection with this only two points are of special importance.

Firstly, the well-known necessity of absolute cleanliness. After various trials, the following method was adopted to insure this. The copper sheet was flushed with nitric acid and water mixed in equal volumes and well rubbed with cotton wool, then thoroughly washed with water and scrubbed with fine sand and excess of a strong potassium cyanide solution. This had the effect of completely removing any copper oxide, and of producing a bright polished surface. Care is necessary that excess of potassium cyanide be used, otherwise a film of copper cyanide may be left on the plate. After well washing with water, the plate was quickly placed in the cell.

The second point is the necessity of completely immersing the cathode in the electrolyte, for the ammonium chloride acts on the copper wherever the latter and the electrolyte come in contact with the air. Copper is dissolved and then deposited on the neighboring freshly deposited iron.

To avoid this, and also prevent the deposit from forming anywhere but on the front of the plate, the back and all parts of the front, except where the deposit was to form, were coated with Brunswick black, so that practically the cathode was wholly immersed in the electrolyte. We previously ascertained that the solution had no action on thoroughly dried Brunswick black.

The anode consisted of rolled Swedish iron, containing 0.029 per cent sulphur and 0.049 per cent carbon. As our object was to prepare iron free from these two constituents, we inclosed the anode in a porous cell. The carbon collected at the bottom of this in the form of a black mud, whilst the sulphur passed into solution as sulphuric acid, and it was impossible to avoid some of this passing through the porous cell. This, however, was reduced to an extremely small quantity by changing the solution in the anode cell twice daily, it being replaced from the electrolyte, withdrawn as before explained from the cathode cell, and diluted so as to contain one per cent ferrous chloride. This enabled us to obtain the iron quite free from sulphur.

By taking these precautions a firmly coherent deposit of iron was obtained which presented a surface of almost silver whiteness and of a somewhat velvety appearance, but, as Varrentrapp and Lenz point out, it contained numerous small holes of a conical shape. These are doubtless due to the formation at starting of small microscopic bubbles which prevent the iron from being deposited. The bubbles appear to grow with time, so that unless cleared away the area of iron shielded by them increases and a conical pit is produced. As the surface of iron under them is quite dry and they are partially shielded by the hole itself, it is very difficult to clear them away by rubbing. It was attempted to do this by means of an automatic scraper, which passed every 15 minutes over the surface of the plate, but it was not completely successful. It will probably be better to have an automatic arrangement whereby the cathode is raised bodily out of the electrolyte and exposed to the air for a few seconds, when the bubbles will break of themselves.

When the apparatus was in working order the iron was deposited at the rate of about three grams per 100 square centimetres in 24 hours. With the above precautions the process worked continuously and without interruption.

The Band Arc Lamp.

The Siemens & Halske Electric Company of America, Monadnock Block, Chicago, are the manufacturers of a type of arc lamp, illustrated herewith, known as the band arc lamp. This lamp is a shunt lamp, and derives its name from a copper band which carries the upper carbon holder and which conducts the current to the upper carbon. The construction of the lamp is shown in Fig. 1. An inclined frame *r* turns on pivots *c* and supports the drum *b*, around which the copper band is wound. This frame also supports the train of wheels with the escapement, and, at the upper end of the frame, the iron armature *e*.

The attraction of the shunt magnet *m* and the weight of the upper carbon and holder draw the frame *r* downward, while the spring *f* pulls in the opposite direction. The unwinding of the copper band causes the drum *b* and the pinion wheels to revolve, while the escapement, with its balance lever *a*, oscillates rapidly.

When the frame *r* is near its highest position, a tongue projecting from the lever *a* strikes the stop *g*, and the motion of the clockwork ceases. When the frame *r* is drawn downward the escapement is released and the copper band gradually unwinds from the drum, while the upper carbon holder sinks slowly by gravity.

When the current is turned on the frame is drawn downward by the shunt magnet; the copper band unwinds until the carbons touch. The current then flows through the carbons instead of through the shunt, and the magnet loses its attractive power. The spring *f* draws the frame up again and forms the arc between the carbons. As the carbons are consumed at the points the arc grows longer, the current in the shunt magnet is increased gradually and the frame is drawn down to a position which it will retain permanently. The slightest change in the length of the arc will start the escapement and this will cause the lamp to feed gradually.

Among other details of the working parts of the lamp, which cause it to burn quietly and steadily, may be mentioned: The dash-pot, to check a too rapid motion of the frame; a contrivance which makes up for loss of weight caused by the burning of the upper carbon, and the peculiar shape of the pole shoes and armature.

The whole mechanism is fastened to a cast-iron plate and is closed above by a cast-iron cover, which causes the terminals. The lower cross-piece serves as a carbon holder; a ball and socket joint carries the clamp for the lower carbon. The arc descends gradually as the lower carbon is consumed. The carbon clamps are adjustable. Carbons of different diameters can be held by them and they can be properly centered by means of the lower holder.

Fig. 2 illustrates the direct-current lamp. In the alternating-current lamp the core of the magnet and the armature are made of laminated iron, to prevent heating by Foucault currents.

The lamp globe is held by two hooks; when the lamp is to be trimmed the globe may be lowered and be kept so suspended by means of chains.

The Siemens band lamps are to be used for constant potential circuits only. On a 110-volt circuit two direct-current lamps or three alternating lamps may be connected in series with a resistance, which latter must use up the surplus voltage.

One form of adjustable resistance is shown in Fig. 3. This resistance consists of high resistance wire wound on porcelain-ribbed cylinders mounted on cast-iron bases and covered with metal shields. These resistances are furnished either for indoor or outdoor use.

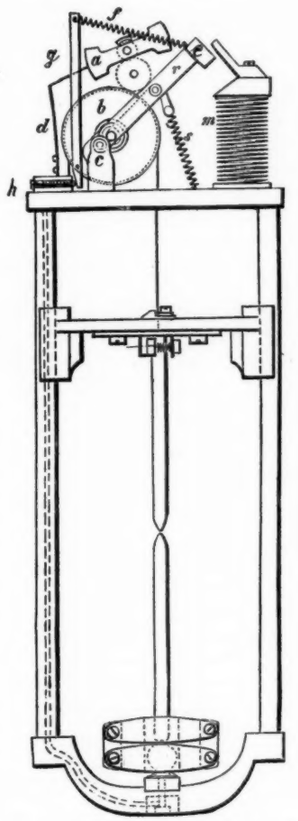


Fig. 1.—Details of Construction of the Band Arc Lamp.

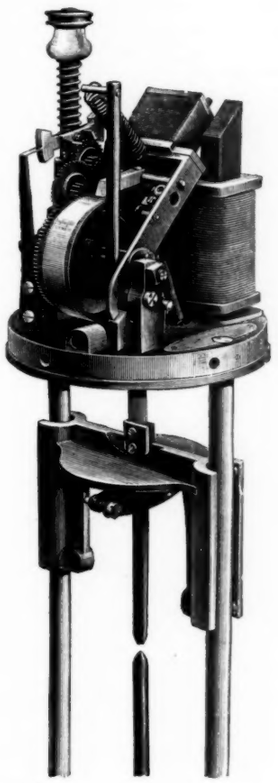


Fig. 2.—Direct Current Band Arc Lamp.

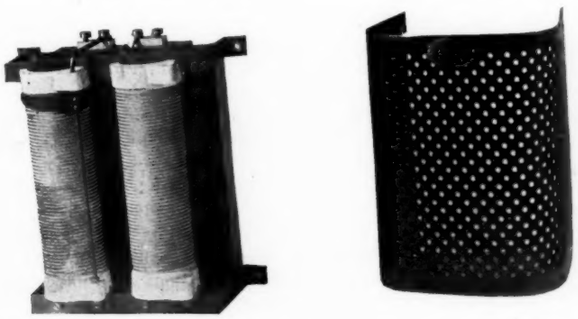


Fig. 3.—Adjustable Resistance for Band Arc Lamp.

The Detroit, Mich., & St. Clair River Electric Railway has filed a copy of a mortgage for $358,000 with the city clerk.

Three Big Street Railway Deals.

Three street railway deals of considerable magnitude and importance were announced last week. It was announced that the Nassau Electric Railroad Company, which recently began operations in Brooklyn, N. Y., would be able to carry out its scheme to control the Brooklyn Traction Company, which owns the Atlantic avenue trolley system, with 42 miles of tracks, and the Brooklyn, Bath and West End system, with 13 miles. Negotiations for the leasing of the traction system by the Nassau company have been in progress for several weeks. The Seligmans control the Traction company. If the deal is consummated, which seems probable, the several lines will be operated as one, and one fare will prevail.

The Milwaukee, Wis., Street Railway Company's property will be sold to the highest bidder within three months, probably shortly after the first of the new year, and will then be reorganized and operated by a new and strong company consisting of eastern capitalists. It is reported that the windup of the receivership is now very close at hand, and that a new company will soon be in charge.

Negotiations have been completed by which the Englewood & Chicago Electric Railway Company and the Chicago & Morgan Park Street Railway Company are placed in the hands of a syndicate of eastern capitalists. The deal, it is said, contemplates the ultimate consolidation of the various electric railway systems from Sixty-third street, Chicago, to the Indiana line, and from the lake to Morgan Park. Overtures have been made to the owners of the Calumet Electric Street Railway Company, which now operates 54 miles of road.

A New Manufacturer Enters the Field.

Osgood & Barker, the well-known manufacturers of paper mill machinery, of Bellows Falls, Vt., have begun the manufacture of dynamos and motors, and will give special attention to the building of motors for boats and carriages. They will also do railroad and general electrical repairs. Among the orders now on hand is one for a two-horse-power motor to run a launch now using steam. They are also building a 200-light dynamo for a neighboring manufacturer.

A Twelve-Thousand-Five-Hundred-Volt Generator.

A record was established at Deptford on Monday by the 1,000-unit machine recently erected by Messrs. Ferranti, when it delivered current at 12,500 volts. This is, to our knowledge, the highest electromotive force ever developed by a machine. The machine was put on the ordinary lighting circuit on Tuesday for six hours, the running being remarkably steady.—*London Electrical Review, October* 25, 1895.

Transmission of Electric Power.

[*From the New York World.*]

The question of the economical transmission of electrical power to places remote from the point of generation is without doubt the most important in the industrial life of the country. People now alive may reasonably hope to live until most of the machinery of the country is turned by electricty generated by water-power and distributed by wire wherever it is needed.

The Auburn, N. Y., City Railway Company has secured the consent of the necessary number of stockholders giving the directors authority to bond for $300,000. These bonds which are to be issued bear six per cent interest, payable semi-annually, and the bonds are payable August 1, 1925. The bonds are secured by a mortgage on all the property of the company. The money thus raised is to be used for completing and equipping the lines now building and paying outstanding bonds.

An Electric Jib Crane.

A London contemporary describes an interesting electric jib crane made and used by the Sandycroft Foundry and Engine Works Company at Sandycroft, Chester, England. The apparatus is made under patents granted to Dr. N. S. Keith. A three-horse-power bipolar motor is geared to the winding drum through an electro-magnetic clutch on the lowest wheel disk, and may run continuously. When lifting, the clutch is brought into engagement by the movement of an electric switch at the operator's left hand. When lowering the load the switch is opened; the clutch then disengages, and the operation is controlled by the brake, the handle of which is held in the operator's right hand. By another switch on the same switchboard another electro-magnetic clutch is thrown into engagement with suitable gearing connected with the motor, for slewing the load to the right or left.

On the load end of the lifting chain, instead of the usual hooks, is placed a powerful electro-magnet which holds the iron or steel mass being lifted. This magnet weighs 300 pounds and takes five and one-half amperes at 110 volts to excite it to its working magnetization, when it will lift a weight of iron or steel exceeding two tons. This electro-magnet is controlled through a switch on the switchboard or else through one conveniently placed on the magnet itself. The current passes to and from it through a twin-flexible conducting cable.

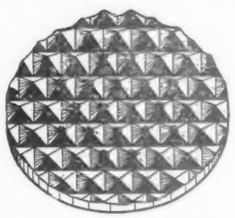
This hoisting machine has been in constant use at the Sandycroft works for several months, its electric current being obtained from the lighting circuit of the works. When the crane was worked by hand-power, and with the usual chains and bars required to sling and loose the billets, it took six men one hour and a half to do that which is now done by three men in one-quarter of an hour, a result which shows the great saving in labor effected by electric cranes of this description. Without the electro-magnet there would still be the necessity for the bars and chains, and the time and work of unloading would be but little decreased.

This electric crane is also used for unloading boiler plates, and each of these is often four and a half feet wide, 22 feet long, and weighing 1,500 pounds. It is evident, too, that this hoisting plant can be used extensively for the quick moving of all forms of heavy masses of iron and steel; it should therefore prove useful not only in the handling of ingots, bars and plates, but in the rapid manipulation of iron and steel goods in more finished conditions.

The conductors and motormen of the Rutherford, N. J., Electric Railroad are discussing a possible strike, because of orders recently issued by Mr. Davis, the general manager, which, they assert, are cruel and expensive. Among the orders they object to is one directing that they must wear white shirts and collars.

The Deckert Telephone Transmitter.

The accompanying illustration, reproduced from the London *Electrician*, represents a back electrode of a Deckert ("Hunningscone") transmitter. In this transmitter the back electrode is molded so as to form a number of pyramidal projections, which are arranged in rows one under the other. When the transmitter is fixed this electrode is placed, as shown in our drawing, in such a position that the pyramids are in horizontal lines, and it will then be observed that each row will have the position of the pyramids alternating to that of the row above or below it —that is to say, the junctions of the bases of one row of pyramids come exactly at the middle of the bases of the pyramids above or below. The object of this arrangement is to, as much as possible, prevent the packing of the carbon granules, which are filled in between the diaphragms. Each pyramid supports a small number of the carbon granules, and these granules, in order to settle down at all, must receive a side motion, which



THE DECKERT TELEPHONE TRANSMITTER.

is a motion not so readily given as a downward one. Assuming, however, that such side motion has been produced and that the granules are caused by the vibrations to work their way to the edge of the pyramids, they fall into the space between, but instead of immediately settling down to the bottom of the transmitter, they are caught by the side of the pyramid immediately below.

It will be observed that at the most central portion of the electrode the apices of the pyramids are tipped with small tufts of silk, thus serving the purpose of forming an insulator between the back electrode and the diaphragm. The diaphragm also has a ring of cotton wool, which is so placed that when fixed in position it is only the central part of the diaphragm—that is, the part which is most sensitive to sound vibrations—which is exposed to electrical microphonic contacts.

The Deckert transmitter, which is used by the National Telephone Company and the Post Office, is made by the General Electric Company, of London.

Storage Battery Cars For Chicago.

The ELECTRICAL REVIEW is reliably informed that the Electric Storage Battery Company, of Philadelphia, has very recently signed a contract with a new passenger railway company in Chicago for the equipment of 50 cars with chloride accumulators. The experimental batteries supplied to the Pullman Company are reported to have proved very satisfactory.

Electricity at the World's Fair of 1900.

According to report of the Commissioner-General of the World's Fair to be held at Paris in 1900, the Champs Elysées and the Esplanade des Invalides, now separated by the river, will be connected by an uncommonly wide bridge, says the *Railroad Gazette*. They and both banks of the river thence up stream, 267 acres in all, will comprise the exposition grounds. Their nearness to the heart of the city insures the nightly presence of a vast crowd, and the brilliant lighting of the two connected places becomes, therefore, a matter of prime importance. As it is also intended to keep all the buildings open until midnight, the power required for lighting reaches 12,000 horse-power, against 1,500 horse-power in 1889.

The power required to show the exhibited machinery and apparatus in motion amounted to 350 horse-power in 1855; 635 horse-power in 1867; 2,500 horse-power in 1878; 5,500 horse-power in 1889, and is estimated at 8,000 horse-power in 1900. Electric power transmission will be employed, as the scheme of organization of the exhibits contemplates the close union of raw material, methods and means of manufacture and finished products. Machinery will thus have to be kept in motion all over the grounds.

The efficiency of the power distribution in Chicago, where a 500-volt continuous current was used, was 73.37 per cent; at Lyons, in 1894, where continuous and alternating current was used, it was 73.38 per cent. Assuming 70 per cent total efficiency, the required steam power is stated as 28,500 horse-power, reduced to 20,000 horse-power by the following schedule:

	Horse-power.
Furnish during the day to motors	11,400
" from 7 p. m. to midnight to one-fourth of the motors	2,900 H. P.
" for light	17,100 H. P. 20,000

In addition a water-power transmission is proposed of 2,100 horse-power from the dam at Suresnes, a distance of somewhat over six miles from the grounds. The assumed efficiencies of 0.75 for the turbines; 0.80 for connection of turbine and generator; 0.90 for the generator and 0.90 for the line, deliver 1,170 horse-power at the grounds and result in a total efficiency of 0.49.

The general policy for the electrical exhibit is thus outlined:

1. Exhibitors to erect central stations for the selling of current to the administration at a predetermined tariff.

2. The administration to erect the line for the distribution of the current.

3. The administration to sell the current from its line to contractors, who shall furnish current for light to the exhibitors located on each one's concession and do the public lighting on the same.

4. Said contractors to furnish and install motors for the operation of exhibited machinery and apparatus, and the administration to furnish the current to operate the motors.

This scheme differs from precedents. At Chicago the administration itself made all the public and private installations. At Lyons a general contractor was charged with the complete organization and installation of the electric service for light and power. At Paris a mixed system will be tried.

During the 180 days of the fair 38,520,000 horse-power hours will have to be furnished; the mechanical, electrical and wage account for same is placed at 6,900,000 francs, or about $1,380,000.

The above data are condensed from a paper by M. G. Dumont, read before the Society of Civil Engineers of France.

Trolley Jack Is Dead.

Trolley Jack is dead. He was a dog known to fame in Paterson, N. J., and he died by the hands, or, rather, the wheels, of one of his pals, a Broadway trolley car. Jack's history is unique.

When Barnum's circus was in Paterson last May a man, followed by a brownish-yellow dog, boarded a car on the Broadway line, says the New York *Sun*. The dog followed the car. The car was crowded, and at Main street the man got out, and in the crowd which congregates on that thoroughfare the dog lost his master.

The subsequent action of that dog showed that he was not like other dogs. He didn't sit and howl, but started at once for the place where his master had boarded the car, and, after getting his bearings, sat on his haunches and waited for a Broadway car to come along. When the car hove in sight Jack followed it for a way, took a careful survey of its passengers, and, not finding his master, returned to his vigil. From that day to the day of his demise, Jack was following Broadway cars and only Broadway cars, often going "around the horn with them," a distance of five or six miles. His camping ground was Broadway, anywhere between Twenty-fifth and Twenty-seventh streets, and after his excursions after cars he invariably returned to his old haunts. He picked up a tramp living, being fed in turns by the people of his neighborhood.

Jack was known to all the motormen and conductors and passengers on the Broadway line, and his death is felt deeply by them.

Caught in the Shafting.

Lewis J. Hutchinson, superintendent of the local electric light company at Northampton, Mass., was instantly killed at the power station on November 4. It is probable that he got caught in the shafting, was thrown over a revolving clutch and dashed on the brick floor. The back of his head was crushed, and his arms and ribs broken. He was 29 years old and had been employed in Northampton since September 1.

TELEPHONE NEWS AND COMMENT.

The New England Telephone and Telegraph Company will run a line to Granville, Mass., at an early date.

The telephone company of Groton, Vt., is said to have sold its lines to the New England Telephone Company, who will put in the Bell telephone instruments and connect with Montpelier.

The Ravenswood, W. Va., Telephone Company has secured a franchise from the town to erect and operate a telephone exchange. Mr. E. R. McGugin is superintendent of the company.

Elkton, Ky., the "biggest town of its size in the world," is building a telephone exchange, and will have connection with Russellville, Franklin, Nashville, Bowling Green and several other towns in that vicinity.

A novel telephone scheme is being considered in South Dakota. It is proposed to connect Aberdeen and Tacoma Park by running a telephone wire to a rail of the Great Northern Railroad at Tacoma and make a similar connection at the Aberdeen end of the line.

The projectors of the new telephone system at Penn Yan, N. Y., are awaiting the decision of the United States Supreme Court on the Berliner patent before making a choice of a transmitter. They prefer the Berliner transmitter, but will adopt another kind if the patent on it is upheld.

The Erie Telegraph and Telephone Company reports the following statement of subscribers:

	June 30, 1895.	Sept. 30, 1895.
Exchange	15,783	16,634
Agency	1,162	1,178
Total	16,945	17,812

Net gain, 867.

The Meridian, Miss., & Tuscahoma Telephone Company, covering the post offices of Zero, Causeyville and Hurricane Creek, Miss., and Pushmataha, Butler, Mt. Sterling and Tuscahoma, Ala., has been put into operation. Another line is being constructed to Daleville, Miss., via Marion, Topton and Lockhart stations.

Long-distance telephones are making some giant strides nowadays, and it will not be long before it will entirely supersede the telegraph. Between New York, Boston and Philadelphia there are now about 40 long-distance wires, and in the whole system there are 55,000 miles of pole line and 265,000 miles of wire, and the system is growing fast every day.

The plant, capital stock, leases, contracts and franchises of the New England Telegraph Company, of Massachusetts and West Virginia, which were last Winter sold by Receiver W. M. Osborn, of the United States Court at Boston, and which lines have more recently been operated by the National Telegraph Company, have been sold and transferred to the Nixon Telephone and Supply Company, of Providence, R. I.

The Huntsville-Madisonville, Tex., telephone line has been organized under the style of the Commercial Telephone Company. The line is to be built to Madisonville and Midway. The board of directors is as follows: J. F. Randolph, Madisonville; J. R. Burtis, Madisonville; F. L. Young, Midway; R. S. Rather, C. G. Barrett, L. C. Eastham, J. G. Ashford, Huntsville. The amount of its capital stock is $2,500.

The Southern New England Telephone Company's circular to stockholders, announcing an increase of 10 per cent in stock, says that subscriptions must be made on or before November 15, payment to be made in 50 per cent installments on the 1st of next December and 1st of next April, and participate in the dividend of next July. The proceeds of the sale will be used in the extension of the plant of the company, the stations of which, all furnished with long-distance transmitters, have increased during the last year from 5,529 to 6,565, each new station costing an average of $125. The long-distance service inside the State shows an increase of receipts during the year from $6,500 to $9,000 a month. It is also officially stated that the company has 7,000 miles of wire, 400 miles of pole wire and 15 miles of underground cable, the latter at 10 of the largest exchanges in the State, where 14 out of 168 towns are now reached by the company's wires.

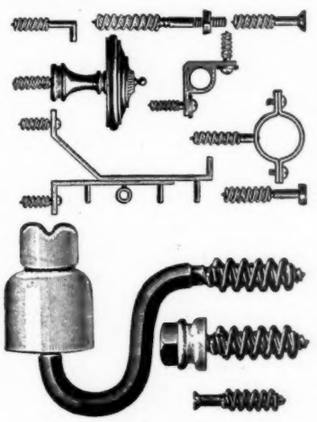
"I have a most remarkable telephone in my house," remarked a resident of the western addition. "I noticed that at times I could hear very distinctly the conversation in the next house. Suddenly it would be broken off short in the middle of a sentence, and I could not hear another word. It would become audible again just as suddenly.

"By a series of experiments I have found out that the sound is conducted by the water running through the pipes. When the water is turned on in my house I can hear all the conversation in any of the rooms next door in which there is running water. When I turn off the water all sounds stop suddenly.

"I told my neighbor of it and we have put it to practical use. When I wish to speak to him I tap on the window, he turns on the water in his house and listens while I talk to him over the water pipe in an ordinary tone of voice. When I have finished he turns off the water in his house and I turn it on in mine and listen. In that way we can carry on long conversations with as much ease as if he were in the room with me. Still our houses are about 20 feet apart."—*San Francisco Post.*

Wire Wall Plugs for Screws.

Mr. F. W. Ostermann, 27 Leadenhall street, E. C., London, is introducing a very useful invention to take the place of the wooden plugs generally used when it is desired to screw into brick or plaster walls. As will be seen from the illustrations,



WIRE WALL PLUGS FOR SCREWS.

which are from our London namesake, the device is simply a spiral of iron wire doubled back upon itself, the inner turns being of such a diameter as to form a kind of female screw thread, while the outer turns serve to hold the "wire plug" in the wall. The method of fixing these "acme plugs" is as follows: A hole is drilled in the wall one-quarter inch greater in diameter than the outside dimensions of the plug and a little deeper than the length of the latter. The hole is then thoroughly wetted by injecting water from a small syringe, and afterwards filled with plaster of Paris. The outer windings of the wire socket are also filled with plaster, and the socket or plug with its screw is inserted in the hole to the required depth. After the plaster has set the screw may be removed, and it is as well to grease it before finally screwing it back. This device is likely to be found of great use by electrical fitters for fixing switchboards, switches, pushes and other electrical fittings, as well as by decorators, plumbers, etc.; more especially when the fitting has to be done in occupied houses. To meet the latter case a very complete and simple set of tools is supplied.

SIMONDS' ELECTRICAL PYROMETER.

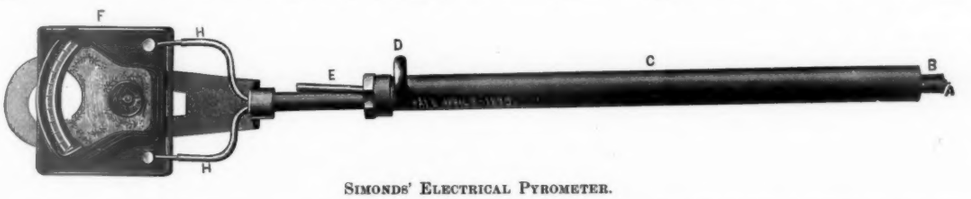
AN INGENIOUS INSTRUMENT FOR MEASURING THE HEAT OF FURNACES.

A. A. Simonds & Son, of Dayton, Ohio, are manufacturers of planing machine knives, engine bars, plates and rag knives for paper mills and various kinds of pattern knives. Mr. A. A. Simonds has necessarily devoted a great deal of attention to the scientific tempering of steel and is an expert on the subject. As an outcome of his experience Mr. Simonds has devised an electrical pyrometer for measuring the temperature of his furnaces. The instrument is shown in the accompanying illustration.

The pyrometer depends upon the thermo-electrical principle, and consists of a couplet of two small wires A (one platinum, the other an alloy of platinum), which are connected with two larger copper wires, the ends of which show at H. These wires are incased in a one-half-inch pipe B; around this is placed another one-and-one-quarter-inch pipe, which serves as a water jacket, the water entering at the one-quarter-inch pipe E, running to near B, emptying, filling the water jacket C and leaving at overflow pipe D. When the two small wires A are heated an electrical current is produced, which passes through the wires H and is registered upon the galvanometer F. The pipe C is inserted in the wall of the furnace, so that the small wires enter the heated chamber. The platinum wires alone become hot, while the rest of the instrument remains cool; in fact it can be left in the fire for any length of time and a continuous reading secured, as long as the water circulates freely through the water jacket.

The pyrometer is about four feet long, but, if necessity demands, could be made either longer or shorter. The only requirements are a one-and-three-quarter-inch hole in the furnace, a constant stream of water and a temperature lower than the melting point of platinum.

In calibrating the instrument Mr. Simonds has used a thermometer up to 600 degrees and then the various melting points of metals. A temperature correction is also necessary, and for practical purposes a table is prepared from which correct readings may be taken.



SIMONDS' ELECTRICAL PYROMETER.

The Detroit, Mich., Electric Light and Power Company, now that it has not the contract for city lighting, is paying its attention to incandescent lighting. It desires some new lines, but the Board of Public Works will not grant the permits, unless a map showing where they go is filed in the office and the abandoned wires and poles are removed. Manager Fitzgerald promises to comply with these requests. He is also anxious to rent a portion of the conduits laid by the public lighting commission.

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SPECIAL NOTICE TO ADVERTISERS.

CHANGES for advertisements must be in this office by Friday noon for the following week's issue. NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, NOV. 13, 1895.

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Reports from electrical manufacturing companies west of Pittsburgh indicate that that section of the country is getting its share of the orders now being placed and that a return to prosperity is being felt.

We would suggest that there is a necessity for a change in the sub-title of our Western contemporary, the *Pacific Electrician*, which states that it is "the only electrical paper on the Pacific Coast." This is not accurate. Messrs. Perrine and Low's new paper, the *Journal of Electricity*, is published in San Francisco and shows great signs of promise.

A recent report is to the effect that the Chicago gas companies have secured control of the right to use acetylene gas within the city limits. "The gas can be liquefied, carried about the streets in small tanks and retailed to customers as needed." Gunpowder and dynamite can also be carried around in one's pockets, but the habit is not one to which many people are addicted.

We notice that one of the large steam railway companies has been equipping several of its yard engines with a device to decrease the amount of black smoke emitted from the stack while the engines are at work. Such devices may do well enough for a temporary makeshift. In the near future the progressive steam railway manager will have all his yard engines and switching engines of the electric type, which require no smoke consumers.

We hope it is not true that Mr. John Jacob Astor has invested any money in the Keely motor scheme. The gentleman is non-committal on the subject. We do not think that Mr. Astor or any other man has money enough to make the Keely motor mote. It is an *ignis fatuus*, which many a one has tried to grasp only to find his hand inclosing the empty atmosphere. Even so able a scientist as the late Dr. Joseph Leidy was compelled to retract his praise of the device after mature reflection.

The ELECTRICAL REVIEW desires to congratulate Mr. H. H. Kohlsaat, proprietor of the Chicago *Times-Herald*, on his generosity and progressiveness in offering such valuable prizes in so worthy a contest as the motocycle, or horseless carriage, competition which will occur under the auspices of his paper on November 28. Such men are of the greatest help to those who spend their time and energy in the development of science. It is safe to say that Mr. Kohlsaat's action has advanced the development of the horseless carriage certainly a year and perhaps more.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

Factors in the speculative world responsible for last week's decline were operative during the week closing today. As a result the liquidation continued without any important check and the final prices were about the lowest. Liquidation has been enormous in some certain quarters. The result has been a practical elimination of weak speculative holdings and the concentration of stock in strong hands. European financial and political complications have grown worse in a week, becoming so serious as to cause a contraction in every quarter where there is any elasticity, and at other points an enormous dumping of securities. Owing to comparatively large blocks of American securities held abroad, this selling has not adversely affected our market to a marked degree. The professional wreckers, by courtesy called bears, who have succeeded in so working on sentiment here as to create a genuine scare, utilized this supply of stock from Europe with good effect and succeeded in keeping prices on the crumble all the week. On Thursday there was a check in the decline in consequence of a temporary better feeling in Europe and favorable election sentiment here. When fresh trouble developed in Paris on Friday local operators forgot all about the election, and the market not only lost its recovery but added to its depreciation. These depressing influences extended quite generally to investment securities. The better class of electrical stocks and bonds suffered in common with others. Those in which there was speculative weakness responded the most readily. In this particular Electric Storage Battery was pre-eminent. On Friday it established a new low price. The common touched 40 and the preferred 41 against the high of last week of 73½ and 75, respectively. This latest weakness was claimed by a director to have resulted from a sale of stock thrown out as a bank collateral. Officers of the company have been very active in circulating statements concerning the intrinsic value of the property, its brilliant future, etc., etc. Some perfectly ridiculous forecasts as to the figure that the stock will eventually reach have been made. One estimate was 200, another 2,000. Meanwhile, it has not enough believers at current prices to rally it. There is no telling to what figure it may be advanced if the craze can be re-created. There is something subtile about an electrical security that magnifies the greatness of its possibilities—General Electric at 110 for example. The present check will be a good thing, as it will cause prospective buyers to think twice before putting their money into a security that can drop 35 points in less than 10 days, in times of normal business.

I recently talked with one of the foremost electrical experts of the country, who is far from satisfied with the practicability of the storage battery from a commercial standpoint. He makes the point not heretofore

brought out in secular journals that the weight of the batteries is a serious drawback to their use.

Poor old General Electric is just now being tossed about by professional operators, the victim of the gossip monger and shunned by the investor. It failed to rally and can now be bought between 30 and 31. Interests having stock to sell or support started a story this week in effect that negotiations with Westinghouse had been resumed; that they had been taken out of the hands of President Coffin by J. P. Morgan & Company. I learn upon unquestionable authority that this matter has not been brought before the board since they were dropped. If Mr. Morgan has taken them up on his own responsibility his interest in General Electric would appear to be greater than is generally supposed.

An interest in close touch with General Electric tells me that there is nothing new concerning the company outside of the routine. It is doing a fair business—a little larger than last year—at a slightly better margin of profit. The Lynn strike has not at any time seriously interfered with the company's operations, and just now is not a factor, as all the castings desired are being secured. The strike, I am told, will not in any particular change the policy of the company regarding the maintenance, reduction or removal of the Lynn plant. Various rumors and reports were circulated to account for the selling of General Electric last week and this — the decline from high — has been some 11 points. Among others were the following: Sale of the Ames estate holdings, denied; exchange of General Electric with Westinghouse by prominent Boston capitalists, denied; apprehension over the success of the Tesla motor; serious aspect of the Lynn strike; liquidation of a bull pool, etc.

It is probable that a pool has liquidated because of the general market tendencies. A noticeable feature of the market for the stock was a fair demand around bottom figures. The low point is 30, about its present selling price.

Western Union succumbed under attack, going to 88½ from 90⅝. American Telegraph and Cable was quoted at 96. Edison Electric Illuminating of New York sold at 97 @ 97½. The first mortgage bonds of the Brooklyn Edison company recorded a sale at 110¼.

On the Boston Exchange, Bell Telephone was strong until the latter part of the week, when it weakened 1½ to 199½. Erie Telephone had a further decline, going from 62 to 60. New England Telephone dropped to 86. Westinghouse was quoted at 34 @ 34½ for the common and 54 @ p54½ for the preferred.

Storage Battery common and preferred stock had a sharp drop in Philadelphia Saturday. Common dropped 6½ points, preferred 8½. Both went to 35½. BAIN.

New York, November 9, 1895.

OUR CANADIAN LETTER.

PORNEUF, QUE.—It is rumored that an electric light plant will be installed here.

STIRLING, ONT.—There is talk of an electric railway connecting the village with the Canadian Pacific Railway at C. O. Junction.

WINCHESTER, ONT.—The ratepayers of this village are reviving the agitation for an electric railway between Morrisburg, Winchester and Ottawa.

ALEXANDRIA, ONT.—The contract for an electric light plant and for wiring the streets has been awarded by the Village Council to Ahearn & Soper, of Ottawa.

PORT ARTHUR, ONT.—At a public meeting held a few days ago the proposal to establish a pulp mill, with sufficient power to operate the street cars, was discussed.

PORT PERRY, ONT.—A scheme is on foot to construct an electric railway from Kincardine to this town. Curts has raised the sum of $500 to pay surveying expenses.

HUNTSVILLE, ONT.—Mr. V. M. Roberts, C. E., of St. Catharines, has made a survey of the town with a view of establishing a system of electric light. The cost would be about $10,000.

TRENTON, ONT.—The Wm. Hamilton Manufacturing Company and the Canadian General Electric Company have been awarded the contract by this town for the water power and general machinery, electric light plant, etc., for a three-phase plant to be erected here. The contracts involve an expenditure of $50,000, and it is proposed to run electric wires to Belleville, 12 miles distant, for power transmission. J. A. C.

Montreal, November 9.

Roman Relics in London.

[*From the London Sun.*]

A discovery, which is exciting great interest among archæologists, has just been made in the city in connection with the construction of the new electric railway between Waterloo and the Mansion House. At Queen Victoria street the workmen have come unexpectedly upon an interesting number of Roman remains, consisting of bricks and tiles, mosaic pavement, etc., evidently associated with the Roman occupation of Great Britain. The remains are being carefully collected.

Columbia Incandescent Lamp Company.

The product of the Columbia Incandescent Lamp Company, St. Louis, Mo., is enjoying an exceptional amount of popularity among central station men and other users of incandescent lamps. The company have recently made additions to their manufacturing equipment which increases their daily output of lamps by 2,500. The Columbia plant is at present one of the busiest manufacturing establishments in the electrical field.

Parsons' Steam Turbine.

A London contemporary states that the Westinghouse Electric and Manufacturing Company has purchased the exclusive manufacturing rights of the Parsons' steam turbine for the United States.

The Crandall Electric Signal.

TO THE EDITOR OF ELECTRICAL REVIEW:

I read in your issue of October 30 a description of a new device known as the Crandall, for signaling at sea, etc.

I notice from your description that you place this matter before the world as *new*. So far as that statement is concerned, I take exceptions to it. While in Europe last year (London, where I spent a year) I became very familiar with devices of this kind, particularly the one invented by Mr. C. E. Kelway, of London, which is exactly like the Crandall and was submitted to Her Majesty's Admiralty for adoption. I am told by the Junior Lord of the Admiralty why this invention was not adopted.

1. It is too large and bulky.
2. It can only be seen one way.
3. In order to see it over two miles, it would require a frame so large that it could not be handled in a storm.
4. Without the frame was of mammoth size, when the letters, such as R, were shown at two miles it had the appearance of a ball of fire.

Aside from the Kelway patent, I give you some of the patents with number, date and name of patentee, in order to verify my statement that it is not new, all of which are a matter of record, and can be obtained by any one interested: Richard Joseph Crowley, London, 8,174, May 13, 1892; Benj Joseph Barnard Mills, 15,167, October 1, 1892; F. William Colby, 3,053, June 24, 1893; Pierre Chas. Eugene Champion, Paris, 6,793, March 12, 1892; Alfred Julius Boult, London, 16,144, December 8, 1894; as well as Mr. Kelway's, which I have seen, but cannot give the number of now. Yours truly,

C. V. BOUGHTON.

Buffalo, N. Y., October 31.

PERSONAL.

President George A. McKinlock, of the Central Electric Company, Chicago, visited New York city last week, stopping at the Hotel Waldorf.

Herr Hans Zopke, a German State engineer commissioned by his government to look into the methods adopted in this country for the propulsion of cars by electricity, is now visiting Washington, D. C. He thinks America is far ahead of any other country in the use of electricity. Herr Zopke expects to spend the next six months in this country.

Some Interesting Predictions.

A gentleman, well-informed in electrical circles, made the following predictions to the editor of the ELECTRICAL REVIEW on Monday of this week:

1. You will soon see a union of the Westinghouse and General Electric Companies in the matter of prices.
2. The J. P. Morgan interests have assumed control of the General Electric Company.
3. Mr. C. A. Coffin has tendered his resignation as president of the General Electric Company and will become associated with Mr. R. T. McDonald in the Fort Wayne Electric Corporation.

SAWYER-MAN PATENT INVALID.

Berliner Case Must Be Tried.

IMPORTANT DECISIONS BY THE UNITED STATES SUPREME COURT.

The United States Supreme Court at Washington, D. C., on Monday of this week rendered two decisions of interest to electrical people. The first declared the incandescent lamp patent of Sawyer-Man invalid and the other was to the effect that the Berliner telephone case must be tried on its merits before the Supreme Court for a final decision.

The Sawyer-Man patent was involved in what is known as the "McKeesport case." This was an infringement suit of the Consolidated Electric Light Company, owners of the Sawyer-Man patent, against the McKeesport Light Company, of McKeesport, Pa., who used Edison lamps. The case was before the Supreme Court on appeal, the United States Court for the Western District of Pennsylvania have previously decided in favor of the defendants. The Supreme Court confirmed this decision, Justice Brown rendering the opinion. The court below decided, first, that the Sawyer-Man patent was invalid because of amendments to the application, which made it in effect a new application; and, second, that the priority of invention was with Edison. The second point, Justice Brown said, had not been considered by the court because the conclusion on the first disposed of the case. It was their opinion that the claim of a conductor composed of carbonized fibrous and textile material is too broad to sustain the patent, and it must therefore be declared invalid.

Chief Justice Fuller rendered the opinion in the Berliner case. This was in the suit of the United States *vs.* the American Bell Telephone Company to cancel the Berliner patent, which the Court of Appeals for the first circuit decided against the government. The telephone company recently moved to dismiss the appeal for the reason that under the Courts of Appeals' act the Supreme Court of the United States has no jurisdiction because the case was one "arising under the patent laws of the United States," and judgments of the Courts of Appeals in such cases were made final.

The United States opposed this on the ground that the act gave the right of appeal to the United States in cases where it was a party. The Supreme Court decides that it has jurisdiction in the case which must now come before it for final decision.

Hot Competition in the Wire Trade.

Last week bids were opened in New York city for 1,000 feet of insulated wire and four pounds of fuse wire, amounting to about $12.87. Thirteen proposals were submitted and on the day the bids were opened 13 salesmen, representing as many wire firms, were present at the orgy.

OUR BOSTON LETTER.

Now that the answer of the National Telephone Company has been filed with the court, and their intention to fight the Bell company announced in unmistakable language, it will be interesting to watch the action of the other independent telephone companies who, according to some of our contemporaries, have been falling over each other in their anxiety to tender moral, physical and financial support to the National company in the impending struggle. When the news that suit had been entered against the National company was first circulated, rumors of collusion with the Bell company were freely promulgated by some of the technical press, and as a confirmation of their views the statement was made that the National company had declined all offers of assistance so freely bestowed by other telephone concerns interested in the result, which fact was pointed out as certain evidence that they had been bought up by the Bell company and would allow a judgment to be taken against them for the purpose of strengthening the hand of the latter company in their case before the Supreme Court.

The ELECTRICAL REVIEW has contended from the start that there was no substantial ground for the attacks made upon the good faith of the National company, and that when the proper time came they wou d be on hand to defend their interests, and in no equivocal manner at that. These statements were based on information from most reliable sources, and we think, to use the language of the esteemed Stuart Robson, "we can say without boasting" that the REVIEW is in a position to know quite as much of the inside of the telephone situation as some of our contemporaries who air their private and personal views so freely, under the guise of reliable information on various subjects. While the National Telephone Company have prepared an exceedingly strong defense and are fully equal to the task of looking after their own interests, they are firm believers in the old adage that "silence is golden" and are not rushing into print with all sorts of possible and impossible statements as to their future action. At the same time they are not, so far as I can see, posing in the light of heroes in the cause of the downtrodden and proclaiming their anxiety to carry the whole weight and burden of the contract on their own shoulders.

They undoubtedly have strong backing—stronger than many people imagine—and will not go into the fight, if it ever comes off, dependent solely upon their own resources; but, at the same time, it is hardly natural to suppose that they would voluntarily and contemptuously decline offers of assistance in the shape of moral, legal and financial support, which, we are told, have been so freely tendered. No doubt it would be of interest to the National company, as well as to all users of telephonic apparatus who do not care to have their present privileges curtailed, to learn the names and financial standing of the parties whose overtures of assistance have been so peremptorily declined. At any rate, it would be a valuable news item, and would go far towards convincing a somewhat skeptical public that the writers of these reports had some better foundation for their statements than the vaporings of an idle imagination.

The Beacon Lamp Company, of this city, have recently made a number of changes in the personnel of their staff. Mr. J. T. Hanbay, general manager of the company, has taken charge of headquarters in Boston, and Mr. E. S. McQuat has succeeded Mr. Cary as superintendent of the factory. The New York office, which is now at 29 Chambers street, is in charge of Jas. Goldmark, and Henry A. Truitt presides over the Philadelphia branch at 213 South Fifth street. Mr. Hanbay reports that business was never better with the Beacon company than at the present time, and that the factory is simply flooded with orders, the average so far for the month of November being something over 7,000 lamps per day. He also speaks encouragingly of the prospects for better prices, which is all that is needed to put the lamp business back on a paying basis, and which cannot be done too soon for the interests of all concerned. H. G. T.

Boston, November 9.

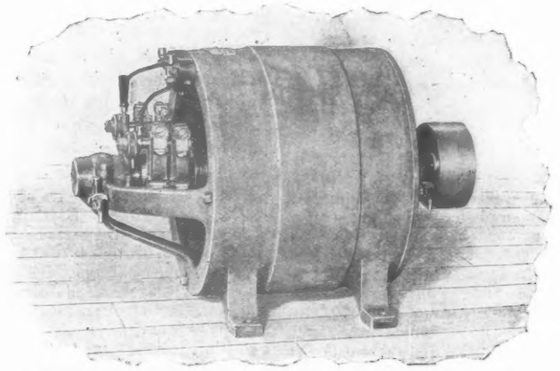
A Seattle, Wash., Lighting Scheme.

When the Seattle, Wash., Board of Public Works recently opened the bids for street lighting for the year 1896 it found among them a proposition to erect a new plant and sell it to the city on the installment plan, the owners meanwhile furnishing light at prices far below those of the other bidders. This proposition came from F. H. Osgood, A. L. Hawley and J. T. Robinson. Mr. Osgood is an electrician and railroad man. He built the first street railroad and also the first electric railroad in Seattle, and is now the owner of the Rainier avenue electric line. A. L. Hawley and J. T. Robinson have for several years been connected with the Union Electric Company, the former as assistant manager and the latter as secretary, but have resigned.

Ironclad Generators and Stationary Motors.

The list of slow and moderate-speed four-pole dynamos and motors of the General Electric Company has been supplemented by a series of machines adapted to smaller output than is practicable with the four-pole type. They are classed under the head I. B. from the fact of having an ironclad bipolar frame, and are built for various outputs from three-quarter to four and one-half kilowatts as generators and from one to five horse-power as motors.

The frames are cylindrical and are supported on short legs. This brings the center of gravity very low and conduces to stability and steadiness when running. The space occupied by the machine is small for its output, and its shape and construction allow of its use in positions where machines of the ordinary bipolar type could not well be placed. The armature has a toothed core with the conductors embedded in the slots.



GENERAL ELECTRIC COMPANY'S SMALL IRONCLAD GENERATOR.

Ample cross-section has been allowed the copper in the field and armature windings, and the insulation is of the highest grade.

The brush holders are designed to hold the brushes firmly and evenly upon the commutator, adjusting themselves readily to the wear of commutator and brush, preserving under all conditions a good contact without excessive friction. The speeds are comparatively low, varying from 1,800 to 1,000 revolutions per minute, according to the size of the machines.

They are especially adapted to the requirements of small motor service. Their small size, low speed, high efficiency and simplicity of construction render them peculiarly valuable in printing, wood-turning and establishments of a similar character, and for the operation of small pumps, ventilating fans, machine tools, etc. A large number of these I. B. motors are already in use. The generators are successfully used in isolated plants and in cases where a small amount of current economically generated is desired.

It is stated that the National Standard Telephone Company has obtained control of the Mutual Automatic Telephone Company, of Philadelphia, by purchase of the majority of the shares legally issued.

ELECTRIC RAILWAY NOTES.

The directors of the Norwich, Conn., Street Railway Company have divided $500 among the employés of the road.

Action has been instituted against the Hamilton, Ont., Street Railway Company to test their right to run Sunday cars.

The report of the Amsterdam, N. Y., Street Railroad for the quarter ended September 30 shows a net deficit of $260.03, as compared with a deficit of $385 for the corresponding quarter last year.

About 6,000,000 people have been passengers on cars of the Brockton, Mass., Street Railway Company and corporations allied with it during the past year—the most successful period in the history of the system.

A new system of payment for the motormen and conductors in the employ of the Hartford, Conn., Street Railway Company went into effect last week. The men are now paid by the hour instead of by the week, and it is expected that the new system will be more satisfactory than the old, to company and employés alike.

The Rapid Transit company and Interurban company are fighting to determine which shall operate an electric line between Saginaw and Bay City, Mich. The Interurban offers the Transit $5,000 to get off the earth, but the Transit wants $30,000, and it is likely two roads will be built where only one will pay.

In Stamford, Conn., the electric road has no power house of its own. It gets its supply of electricity from the electric light company and pays $5 per day for each car run. It has five miles of electrically equipped road and two miles that are not wired. There are six trolley cars and three horse cars in use. The capital stock is $100,000.

The Hudson County Board of Freeholders has refused permission to the Jersey City, Harrison & Kearney Railroad Company to build a bridge over the Delaware, Lackawanna & Western Railroad tracks at Sanford's Crossing, near Harrison, N. J. At this place the passengers are obliged to leave the trolley cars and walk across the Delaware, Lackawanna & Western tracks to the other side. The board's refusal was based on a report of a committee that a crossing would be dangerous to human life.

A new line of railway to connect the Atlantic and Pacific coasts of Nicaragua will soon be projected in that country. The work will be placed in the hands of an American engineer of international prominence, and the funds to complete it will be furnished by the Nicaraguan Government. The only line of railway in the republic at present extends from the port of Corinto to the capital, Managua, thence to Grenada in the interior. The proposed new road will connect with the present line at a point near Corinto, and will run in a southeasterly direction to the city of Rame.

Has Mr. Astor Invested in the Keely Motor?

The New York *Herald* on November 5 published a column-and-a-half story to the effect that Mr. John Jacob Astor had invested considerable money in the inventions of John W. Keely, of Philadelphia. Mr. Astor, it was averred, had purchased all the rights, interests and stock of Mrs. Bloomfield Moore in the Keely motor.

Mr. Astor visited the Keely laboratory and workshops on Tuesday, October 29, and then witnessed, it is said, the final demonstration by the inventor of the practical working of the machinery which develops Keely's mysterious force. This was the last of several visits made by Mr. Astor to the Keely laboratory. Another was made about six weeks ago, in company with Mrs. Bloomfield Moore.

The Keely Motor Company has spent for construction account and for Mr. Keely's personal expenses about $250,000 during the last 20 years. It is thought that Mrs. Bloomfield Moore has given to Keely about $30,000 or $40,000, for use in his shop and for his own maintenance.

By the terms of the agreement between Mr. Astor and Mrs. Moore he is declared to stand in her stead in all the relations she has assumed and interests to which she has become entitled to and in Mr. Keely's discoveries, inventions, machines and contracts. Mrs. Bloomfield Moore has owned a great deal of the stock, but it is not believed that she has very lately owned much.

She has of late years bitterly opposed the company, and denied even, over her own signature, that Keely has ever invented any commercial engine. In print she has affirmed that an air ship is the only thing he is aiming at.

When seen at the Hotel Waldorf, the day after the *Herald* story appeared, Mr. Astor neither affirmed nor denied the accuracy of the report, although he admitted having visited Keely's workshop and that he was interested in the development of the invention.

Catalogues Wanted.

To the Editor of Electrical Review:

If not too much trouble, please have some of the electrical houses of New York send their catalogues of house electrical supplies to,

Yours respectfully,

F. E. Wallis,

605 Columbus Memorial Building, 103 State street.

Chicago, November 4.

The Horseless-Carriage Face.

[From the New York Sun.]

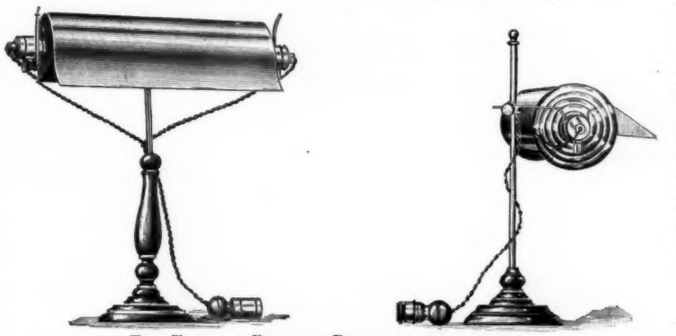
The horseless carriage, used for pleasure purposes, is to be seen at times in the upper part of the city. A stylish one, in which two wide-awake riders were seated, made good time through several of the busy streets there the other day. It was on Columbus avenue. The rider at the helm was skillful under difficulties. He had to be on the alert every moment, as he guided the carriage amid the flying cable cars, the wagons and other vehicles, the bicyclers and the pedestrians with which the avenue was crowded. He succeeded in keeping the thing clear of the dangers that environed it, and in preventing it from jolting against other things or from running over people. After a while the helmsman's anxiety became visible. His features were raveled; his expression turned to that of a terrified savage; he glared. His face was ten times more aggravating than the bicycle face; it was of a kind that might be called the horseless-carriage face, or, for short, the horseless face. We must hope that such a face will not take possession of all those people who may hereafter use the horseless carriage when bent on pleasure. We protest against the face and against the introduction of it. Better have droves of horses on every block in the city all day than even one specimen of that face to the block. If a woman were to make her appearance on Broadway in a horseless carriage publicly displaying a facial expression like that of the engineer of the horseless carriage upon Columbus avenue yesterday, people would surely dart into the side streets.

We have seen but one horseless face. We do not want ever to see another.

The street cars of Providence, R. I., are to be equipped with fenders.

The Espersen Revolving Shade Lamp.

The Pacific Electric Company, 108 Tenth street, Tacoma, Wash., are the manufacturers of the Espersen revolving shade lamp, two types of which are illustrated herewith. This device was produced by Mr. A. F. Espersen, the superintendent of the company, and is sold at a very reasonable price. It affords complete protection to the eyes when used as a desk light and allows the light to be turned in any direction. By turning the shade to different angles a light of varying intensity may be obtained and by revolving the shade toward the ceiling a soft light can be diffused over an entire room. This shade is used with especially good results in a sick room or hospital. It may be attached to a chandelier or fastened to a wall by means of an extensible arm.



Two Types of Espersen Revolving Shade Lamp.

The La Burt Underground Conduit Electric Railway System.

Mr. John La Burt, engineer of the La Burt Electric Railway Company, of New York city, is the inventor of the underground conduit electric railway system illustrated herewith. In this system the slot is placed at one side after the fashion of the Buda Pesth system. By this plan the rails are used in forming the conduit and heavy and expensive yoke construction is avoided. The conduit is small, but is well drained by sewer taps at frequent intervals. A revolving brush, as shown, keeps the conduit clean, if necessary.

The conduit is eight inches wide and is formed of two specially rolled rails, 12 inches deep, shown in Fig. 2. This represents a section of the conduit through a junction box, such boxes, 16 inches by 16 inches, being placed at the joints in the conductor. The underground trolley carries two trolley wheels, which travel on a round metal conductor of large diameter, made of brass pipe, inclosing a core of clay or some such material, to give the necessary solidity and weight. This conductor is in sections, insulated from one another at their ends by a flexible joint. They are supported by the bell crank shown in Fig. 2, placed at each junction box, and pivoted as shown. The trolley wheel raises one arm of the supporting lever, thus forcing the other arm in toward the small porcelain-lined iron cup, four inches by six inches, shown at the side of the stringer. This throws in the plunger and completes the circuit. The contact points are platinum. After the car passes, the weight of the conductor begins to depress the lever arm and to withdraw the plunger from the cup, breaking the connection. The length of the sections of the conductor allows one end of it to sag and break the connection while the other end is held up on the trolley wheels. The cup is closed with a flexible rubber cover and has a mica shield midway of its length to prevent sparks from reaching the rubber and burning it.

The current is carried on a copper cable imbedded in the wooden stringer as shown. Connection up through the lever arm to the conductor is made by a wire inside the lever arm to avoid any chance for leaks.

One important point of superiority claimed for this system is its positive action in making and breaking the circuit. Those interested in the conduit propose to construct it for $15,000 a mile.

Figs. 1 and 2.—The La Burt Underground Conduit Electric Railway System.

A Puzzle for Galvanometer Sharps.

To the Editor of Electrical Review:

The following query may appear to be paradoxical, but it will no doubt tend either to instruct or amuse many of your readers. I have known several old hands puzzled by it and its discussion in your columns will no doubt be interesting to most budding electricians.

I would premise that there is no quibble, or fake, or *double entente*, and the query must be taken as being put as honestly and straightforwardly as the writer knows how.

Take any good condenser and convenient battery power as commonly used, connected to a reflecting galvanometer and discharge key.

1. Short circuit condenser to avoid possibility of residual discharge.

2. Open condenser and charge it with either a plus or minus current for a definite period.

3. Now, without discharging the condenser, give it another charge of the opposite sign, same battery and period.

Query. What deflection will I get when I now discharge the condenser, expressed in terms of the first deflection?

Yours truly,

Episcopus.

P. S.—I would suggest that those who know the result and can reason it out, keep quiet, and let the others work it out.

New York, November 7.

LOCAL ANNEALING OF HARD-FACED ARMOR PLATES.

READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK AND CHICAGO, OCTOBER 23, 1895, BY HERMANN LEMP, JR.

Every one is now more or less familiar with the Thomson electric welding process, which in past years has been introduced in almost every metal industry, in one shape or another. This process created a new field in the technical application of currents of large volume and small electromotive force, a field which, while it was primarily intended for welding, naturally suggested a number of other applications to so fertile an inventor as Professor Thomson; and so it happened that early in its fundamental inception the use of large currents was contemplated to be utilized for heating plain metal bars or parts of sheet billets, etc., for forging purposes, to rivet, upset, to temper or withdraw the temper, or to be worked upon in any well-known manner while being kept heated by the current.

It has been the good fortune of the writer to lately work out one of these novel applications,and since the literature concerning this branch of electrotechnics is somewhat limited he has thought it advisable to bring an account of the same before the Institute.

One of the latest advances in the making of protective armor for battleships, or even forts, has been the introduction of what is known as the Harvey process. For those not conversant with the latter, I will briefly state that it consists in taking an ordinary low carbon steel plate and introducing an additional percentage of carbon into the surface metal, thus changing the crust to the depth of about an inch into a steel resembling tool steel. A plate thus treated is, lastly, water-hardened, similarly to an ordinary tool, and by experience has shown to offer, under equal conditions, more resistance to the impact of a projectile than any other armor known. And, therefore, we will take this as an illustration of hard-faced armor. The extreme hardness of the surface of a Harvey plate, while exceedingly valuable in preventing projectiles from piercing it, has a disadvantage when it is required to be pierced by a drill and tap. Such holes may be required either for fastening ladders, swivels or other appliances to the hull of the vessel, or to fasten T flanges supporting the deck to barbettes or turrets.

The methods heretofore used to produce these holes were principally two:

1. To protect the surface of the plate in patches or strips, to prevent carburation, wherever holes were expected to be drilled.

2. To make accurate drawings and patterns of each plate beforehand, to which all holes are drilled before plate is hardened.

Plan No. 1 was practiced in the United States until it had to be abandoned. In practice it was found that numerous alterations in construction, errors in either draughting room or mills, made it necessary to pierce holes where no provisions for annealing were made. It also happened quite frequently that the method for prevention of carburation did not always work satisfactorily, and while white paint indicated well enough where soft metal was expected, very often hard metal was actually found. Hence it was patent from the first that some process was needed to rectify errors of this kind. Experiments were then made with oxy-hydrogen blowpipe, or the electric arc, to anneal such spots as were required to be drilled, and numerous mechanical devices for drilling, with drills of every design and method of tempering, were tried, until it seemed that the case was without a remedy.

It was at this stage that the problem was referred to the Thomson Electric Welding Company, of Lynn, and experiments were immediately undertaken to solve it. The process and apparatus necessary to carry it out, all resulting from the experiments undertaken, will be described presently.

The second method, which is used in England, has the advantage over the first that there is no difficulty in carrying it out, provided there are no alterations made and no errors committed. The present method of construction seems to be to make beforehand a complete model of the vessel to be built; then make accurate drawings and full size patterns of every plate, giving the exact location of every hole. These are then bored, tapped and countersunk to a depth of approximately five-eighth-inch and of a much larger diameter, filled with clay, and then the plate as a whole is heated and hardened with water. (See Fig. 1.)

This method works apparently all right, although, in spite of drawings and models, errors are made. There is no doubt, however, that it is a slow and very costly method of working, and would hardly ever be resorted to in the United States.

From the above it seems clear that there has existed a need for a process by means of which isolated spots, regardless of location, might be annealed so as to permit drilling and tapping.

If, by sending a current of large volume through any spot thus to be treated, the spot is brought to a temperature of approximately 1,000 degrees Fahrenheit, there can be no doubt that the temper has been withdrawn. Experiments carried out to that effect at once showed, however, that upon taking off the heating current the heat was so rapidly conducted away by the surrounding metal masses as to cause the heated spot to become chilled just as effectually as if it had been plunged into cold water. No method of outside protection of the heated spot would prevent this, and the gradual cooling of the spot had to be attained by different means; namely, a gradual and slow withdrawing of the heating current. The method of introducing the annealing current is best shown in Fig. 2.

C C are two copper contacts cooled by water circulating inside. The current enters the plate by one end and leaves it by the other. Right under the contact the metal comes to a bright cherry heat (shown in black), while the portion intervening and partly surrounding the contacts acquires a temperature of just a visible red. Line H H indicates where the influence of the Harvey treatment stops.

The shaded portion in Figs. 2 and 3 shows the zone softened and ready to be machined, while the dotted line shows how far the heat radiation would cause the metal to turn blue. When cooled, the annealed portion shows a chocolate color, while the place where the contacts have been resting is scaled and hard and cannot be touched by a tool to a depth of about one-quarter of an inch. These places can again be annealed lated on, if required.

The apparatus necessary to carry out this process consists of the generator, the annealer proper (transformer) and the regulating apparatus.

The generator is commonly a separately excited alternator of variable potential of a maximum of 300 volts and 100 amperes. The frequency, preferably, should be low, 50 cycles per second being used. When more than one annealer is to be run simultaneously from one generator, constant electromotive force of the latter should be used, and each annealer regulated separately by a reactive coil. The annealer proper is a transformer similar to the well-known welding transformers. As the apparatus is to be operated out-doors, on board of vessels during construction, it is important that the same may be handled with immunity from electric shocks, even when operated in mist and rain.

To meet these conditions a copper-clad type of transformer is used, one in which the secondary is composed of two copper castings each having a rectangular groove, which two halves, when bolted together, form a closed rectangular frame in which the primary is held inclosed. The hollow space intervening between primary and secondary is moreover filled with a heavy oil, which acts both as the insulator and conductor of heat from primary to secondary. The secondary, by completely surrounding the primary, affords an excellent mechanical protection, and prevents electric as well as magnetic leakage. The primary is a copper ribbon insulated with asbestos, and the ratio of conversion is 100 to 1. The transformer has two trunnions fastened to its sides, in a line a little above the center of gravity, which trunnions swing in bearings, part of a yoke which straddles the whole. The yoke in its turn has a hook which may be secured to the latter at any place of the arch, thus allowing the transformer to be suspended, like a compass in gimbals, in any position desired.

It goes without saying that the copper castings which compose the secondary are cut through at one place in the circuit. On either side of the cut, two short platforms form the base for copper contacts of various shapes and sizes, by means of which the currents are made to enter and leave the plate to be annealed. These copper contacts are of forged copper, hollowed out to receive water circulation for cooling purposes and terminate in narrow tips rounded at the end.

The weight of the whole annealer, being approximately 1,000 pounds, is sufficient to give proper contact pressure for all work on a horizontal plate. When inclined surfaces, vertical or otherwise, are to be worked upon, the transformer is suspended so that its weight shall not interfere with the contact pressure, which is obtained for work by bracing the contacts directly with wooden wedges against any object near by. On the outside of a hull, it is proposed to use a pair of electro-magnets, which are made to hold themselves against the iron hull, and form a support for the annealer. Fig. 4 shows some of the various shapes of contacts that are used in various positions.

The remarkable thing is the great amount of current that is being carried by the copper contacts into the plate. The contact surface is seldom more than about one-half inch square, and yet 10,000 amperes are made to flow through it continually. This is equivalent to 40,000 amperes per square inch, a density which is only possible on account of the thorough cooling by the water circulation.

The regulating apparatus is in most cases simply a rheostat in series with the field of the generator. When more annealers than one are run simultaneously from one generator, as mentioned before, a reactive coil is interposed between the two, and this latter has been made automatic; that is to say, provided with a dash-pot, which permits the current to be reduced uniformly and at any given rate it is set for.

This reactive coil is composed of a solenoid coil of cable, well insulated, having a movable laminated iron core which is raised out of the coil by means of a leather strap and winch. The core is composed of thin iron strips placed side by side around a circle, and projecting radially from the same, and being held on top and bottom by a slate disk, in a manner similar to the securing of the copper segments of a commutator. No insulation of the core is necessary, and good ventilation is obtained. The core once raised out of the coil tends to return by gravity and the attraction of the solenoid, but it is checked in its descent by a pair of dash-pots, one on each side of coil. These latter communicate with each other, top and bottom, and have one of the pistons provided with a valve which opens when the core is raised, and closes when the core descends. The dash-pot cylinders are filled with a light mineral oil, which does not freeze nor clog under any ordinary conditions of temperature. An adjustable by-pass valve allows the oil to flow from the tube to the top side

opposite. By opening or closing this valve more or less, any rate of descent and, consequently, diminution of current, can be uniformly obtained without requiring any skill on the part of the operator.

The annealing operation is carried out as follows: The transformer is placed in position, the contacts touching the plate either side of the place marked to be annealed, and the primary current brought up by means of a rheostat to from 75 amperes to 90 amperes for about two minutes, according to the size of spot to be annealed, which will bring the metal to a dull red heat, a temperature at which a pine stick catches fire when held in contact with the plate. If no reactive coil is used, the current is now diminished by turning the rheostat one point every minute. If the reactive coil is used, the core is now raised by winch, the coil put in circuit by opening a short-circuiting switch, and then is allowed to descend on its own account. The operation generally takes *seven minutes*, all told. No difficulty has been experienced from the beginning. The annealing of individual spots was, however, only the stepping-stone to a more important work of a similar nature—work which was about to be given up, owing to what was considered insurmountable difficulties.

In the construction of a modern man-of-war there are many armor plates which act as shields to the guns, and have to be perforated to allow the gun muzzle to pass through and to be either raised or lowered. Some of these shields are circular or oval, with narrow edges around the ports, in the case of Harveyed plate. To perforate these shields after carburation, and before being water-hardened, was the only possible way, since previous experiments had shown that prevention of carburation could not be relied on, and no process was known to anneal the plate locally after hardening. The hardening of a plate once perforated showed itself to be, however, almost impossible; in fact, a matter of chance. In most cases the plate cracked in two, as shown in Fig. 5, or the whole plate became distorted in such a way that it could not be used. As individual spots for holes could be annealed, there could be no doubt that a series of annealed spots could be likewise obtained by the electric process, following a line along which a cutting tool was expected to be run. The first attempt, therefore, and made in England, was to anneal a number of spots in proximity to each other in such a way that the annealed zones should overlap each other.

As described above, it is very important that the temperature of any individual part should be gradually and slowly withdrawn; and while for individual spots the only possible way was to do this by gradually diminishing the current, it was obvious that when a line was to be annealed, instead of annealing a number of spots side by side, the same effect of withdrawing the heat gradually from one portion could be obtained by moving the apparatus itself relatively to the plate to be treated. The rate of this movement, of course, depended upon the rate at which the temperature should be allowed to fall in any particular spot to prevent chilling. The apparatus was, therefore, arranged to be moved along a line to be annealed, the motion being obtained by an ordinary screw and nut held in a bracket, the nut being turned at a predetermined rate controlled by a watch. It was found that a speed of about one-quarter of an inch per minute was sufficiently slow to insure thorough annealing.

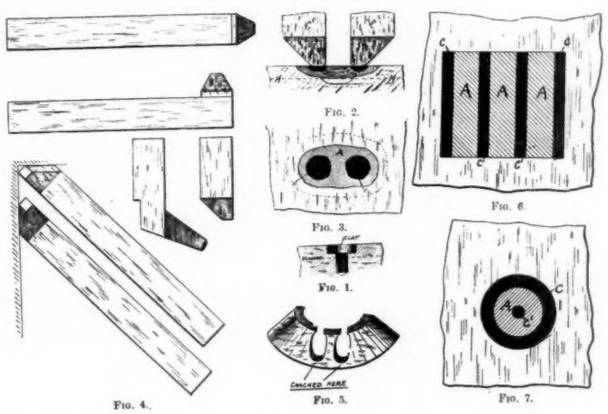
The copper contacts were of the simplest kind, as described above, bedding themselves partially in the surface, and when being dragged along by the screw and nut, raised in front of themselves a burr or chip similar to a planing tool. After a whole day's continuous use the copper contacts were found intact, while a number of chips from the steel surface were lying about. We thus had the peculiar phenomenon of a hard steel chip cut with a copper tool.

Upon the completion of the work it was found that a strip about two and one-quarter inches wide throughout the length over which the machine had been moved could be operated upon by drills or a shaper, in a manner as easily as if it had never been hardened before.

In the work just described the apparatus was moved about, but in regular practice it would be better to construct a machine consisting of a large bed, on which the plate to be treated may be fastened and moved in any direction automatically at a predetermined speed, while the annealer proper is suspended in a given position above plate. The annealing operation occupies but a small percentage of the time required for the cutting.

It is unnecessary to state that when the apparatus is used for continuous annealing, the primary current is kept at a nearly constant value, the diminishing of heat at any individual spot being obtained solely by the moving of the apparatus from it.

As mentioned before, the places where the contacts are passing over the plate, being brought to a higher temperature than any other, remain hard. Experience has demonstrated, however, that they may be reannealed later on by treating the spots in the same way as any other hard spot on the plate. By this means we are therefore able to anneal any shaped portions, not merely lines. This is best seen in Fig. 6, in which a series of strips are annealed side by side (shown in shaded lines A). The hard-faced surface is then removed on such places by a planer and drill; the machine is then run a second time over the annealed strips, resting it this time on the bottom of the groove and on the softer metal, thus annealing the ridges C left between the annealed strips, on which ridges the contacts were running previously. When all these strips are annealed they may be removed by machine tools without any further difficulty.



Diagrams Illustrating Hermann Lemp, Jr.'s, Paper on "Local Annealing of Hard-Faced Armor Plates."

In a similar manner a large round place may be annealed, as shown by Fig. 7. The transformer is set on the plate, one contact resting on C', the other at any other place in circle C; the apparatus is then slowly revolved around contact C' as a center, until the second contact has completed the circle C. The shaded portion A represents now the annealed surface, which is removed by a cutting tool. The contacts are then made to rest on either side of the center C', and the latter is annealed and removed in its turn.

The apparatus may also be used for the reversal of the annealing process; that is to say for creating isolated hard spots in soft tool steel by sending a current through the spot to be hardened until it reaches a bright cherry heat, and then suddenly removing the current or machine.

Various other applications will suggest themselves in the operation of this process, already adopted by the United States Government. It may be used in the construction of burglar-proof safes, for dies and punches, for projectiles and other articles of a similar nature.

The Interurban Electric Railroad Company, which proposed to connect Skaneateles and Port Byron with Auburn, N. Y., and to construct an electric road in the latter place, has met with severe opposition from the Common Council of Auburn.

Electric Power in a Shoe Factory.

A change of considerable interest to the shoe manufacturing trade is being made by the General Electric Company for a factory in Ohio, which is engaged in equipping its works throughout with electricity for the operation of its machinery. For this purpose a 75 horse-power multipolar moderate-speed generator driven by a belt from a steam engine has been installed and a further provision made for a generator of about 100 horse-power for direct connection to an automatic engine. The current from the generators is supplied to the following motors: Two of three-horse-power capacity slow-speed type, geared direct to the shaft of the fitting room; one of 15 horse-power belted directly to the line shaft in the bottoming department; one of 20 horse-power coupled directly to the dust collector. A further installation of motors will be made a little later on in the fitting room and also in the bottoming department. Still another motor will run an additional dust collector, and two belted motors will run elevators. The first motors were started a few days ago and, it is reported, the operation of the machinery so far seems perfect.

This is the first step towards the adoption of electricity in shoe manufactories in that section, and it is anticipated that the economy and convenience shown in this plant will lead to its more extensive use in the operation of many old, and certainly all new, shoe factories.

Test of Storage Battery Cars in New York City.

A preliminary test of a storage battery car equipped with chloride accumulators by the Electric Storage Battery Company, of Philadelphia, was made last Thursday night on the Madison avenue horse railway line in New York city. The new car has a longer wheel base than the horse cars now in use, and the chief object of this test was to discover what changes would have to be made in certain curves on the line. It was found that some of the sharp curves will have to be modified. It is expected that final tests of the newly equipped cars will be made within three or four weeks. After that a number of cars will be placed in regular service to run during the Winter.

A Street Railway Libel Suit.

The Denver Consolidated Tramway Company has brought suit for criminal libel and damages aggregating $300,000 against the *Rocky Mountain News*, of Denver, Colo., for alleged libelous remarks made by that paper regarding the means said to have been employed by the railway company in defeating damage suits brought against it by persons injured by the company's cars.

The city of Athens, Ga., is now experimenting in the operation of its own arc light plant. A few nights since the plant was turned over to the city by the former owners, who had sold it to the city for $9,000.

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Electric Railways.

WILMINGTON, MASS.—A petition is under consideration for permission to construct a line from this place to North Woburn, connecting there with the Woburn line.

SAUGATUCK, MICH.—South Haven fruit growers are agitating building an electric road from this place to Benton Harbor. Many fruit growers will give the right of way.

FORT WORTH, TEX.—A trolley line 40 miles long is to be built through Huntington County, Indiana.

BROOKLYN, N. Y.—The proposition of the Nassau Electric Road to lease the Coney Island & Brooklyn Road at an annual rental of $80,000 has not been considered favorably by the latter company.

NEW YORK, N. Y.—Fulton Street Railroad Company has been incorporated. The road is operated between the Fulton and Cortlandt street ferries, and the capital stock is $500,000.

FORT LEE, N. J.—It is expected that by June 1 next the electric railroad from this place to Englewood and thence to Hackensack will be in operation.

OTTAWA, ILL.—The Ottawa Street Railway's properties will be sold at public auction November 30.

WATERTOWN, MASS.—A franchise has been granted to the Waltham-Watertown Street Railway Company for a location on Pleasant and Bridge streets, Bemis, to the Newton line. This proposed line is to run from Waltham by way of Main and River streets to the Watertown line and thence to the Newton line.

BURLINGTON, PA.—The trolley road of the Pennsylvania Railroad Company from this place to Mount Holly has so far given satisfaction and in all probability it will be extended to Vincentown and Medford. The company has lately adopted an air brake similar to the one in use on the steam trains, and it works admirably.

ROCKVILLE, MASS.—The Hartford, Manchester and Rockville Tramway Company has awarded the contract to build the extension of the road from Manchester to the Vernon town line to Frey C. Ley, of this city.

DAYTON, OHIO.—The Cincinnati, Hamilton, Middletown & Dayton Street Railway Company is making final surveys for its proposed electric road, estimated to cost $1,000,000.

BALTIMORE, MD.—The Gunpowder Railway Company has been organized by James Young, James Gilmore, Chas. B. McClean, Wm. A. Smith and others to build an electric road from the eastern suburbs of the city to the Gunpowder River.

SHAEFFERSTOWN, PA.—The Reading & Womelsdorf Electric Railway will extend their lines to this city. It will cost $80,000.

JEFFERSONVILLE, IND.—The street railway has been sold to a syndicate who will transform it into an electric road and extend it 25 miles.

WEBB CITY, MO.—The right and privileges for an electric railway is to be sold at public auction by the Mayor, J. J. Funk, on November 6.

NORWALK, CONN.—The Norwalk Street Railway Company has petitioned the Court of Common Council for permission to double track and extend its lines.

SPRINGFIELD, MASS.—An electric railroad is to be constructed from Northampton to North Amherst.

PITTSFORD, VT.—An electric road will probably be constructed from Pittsford depot to Pittsford Mills.

KANSAS CITY, MO.—A new electric line will probably be constructed east on Fifth street to Lydia. Original owners held a meeting recently in reference to buying or leasing the old roadbed in order to operate an electric line upon it.

FRANKLIN, N. H.—An electric railroad will probably be constructed.

NEW ALBANY, IND.—The street railway company is inclosing the front platforms of its cars for the protection of the motormen, in compliance with a law passed by the last General Assembly.

UNADILLA, N. Y.—There is talk again of an electric railroad from this place to Franklin, to be run by power generated at the Crookerville mills, Lloyd's mills and a water right at Franklin. The road would cost over $100,000 to build.

ALBANY, N. Y.—The Buffalo Traction Company has been incorporated to construct a street surface railroad 66 miles in length to be operated by electricity. The road is to be constructed from the Buffalo city line at South Park, and from the city ship canal in the Hamburg Turnpike to the Buffalo city line in O'Neill street and across the city of Buffalo to the Pine Hill road in the town of Cheektowaga, which places will be its termini. The capital is $3,000,000 and the directors are E. G. S. Miller, Joseph B. Nayer, Leonard B. Crocker, Washington Bullard and Herbert P. Bissell, of Buffalo; Tom L. Johnson, of Cleveland, O.; Richard Ladenburg, John K. Page and Louis Kahn, of New York city.

COLUMBUS, OHIO.—A company was incorporated recently to build the Lima & Piqua electric street railway from Lima to Piqua, passing through the towns of Cridersville, Wapakoneta, St. Mary's, New Bremen, Minster, Laramie, Newport, Houston and Sidney, with the right to extend the line beyond these termini in the counties of Allen, Auglaize, Shelby and Miami. They will also furnish electric light, heat and power to the cities through which they pass. The incorporators are B. C. Faurot, D. W. Jay, D. Armstrong, William H. Hartman, S. W. McFarland and Edward Purpus. The nominal capital is $9,000.

ALLENTOWN, PA.—There is a project afoot to build a trolley line from this place to Reading.

YONKERS, N. Y.—The Yonkers Electric Railroad Company has decided to place fenders on all its cars.

DENVER, COLO.—The Denver & Southwestern Railway Company has been incorporated by F. J. Bancroft, E. H. Smith, F. D. Levering, John H. Densison and Alexander Berger to construct an electric railway within Arapahoe and adjoining counties. Capital stock, $100,000.

JERSEY CITY, N. J.—The Puerto Pedre Company has been incorporated by Edmund F. Harding, Thomas F. Lennon and Jos. J. Schmidt to build steam and electric railways, etc., in Cuba.

OWOSSO, MICH.—Owosso & Corunna Electric Street Railway Company has been incorporated by James H. Edmonds, Irene D. K. Ralph and Willis K. Armstrong. Capital stock, $50,000.

WASHINGTON, PA.—The Washington & Canonsburg Railway Company has been incorporated with Arthur Kennedy, president; Francis J. Forrauer, Thomas B. Hutchinson, L. H. Matthews and others to construct an electric railway seven miles long. Capital stock, $75,000.

CHICAGO, ILL.—J. G. Shaffer, representing a syndicate of capitalists from Chicago, New York and Philadelphia, has closed negotiations for the purchase of the franchises of the Englewood & Chicago Electric Railway and the Chicago & Morgan Park Street Railway lines.

Electric Light and Power.

NEW BERLIN, N. Y.—The New Berlin electric light plant is being rebuilt and it will be twice the size of the original building.

FRANKLIN, PA.—The Franklin Electric Light Company has secured the contract for lighting the streets of that city.

MONROE CITY, MO.—Monroe City Electric Light Company has been incorporated; capital, $10,000. Incorporators, William Wood, E. P. Melson, W. T. Ragland.

PARK RAPIDS, MINN.—An electric light system will be put in in the Spring.

NUNDA, ILL.—A franchise has been granted to construct an electric light plant.

PASSAIC, N. J.—The Passaic Lighting Company will soon start work on a new building on Passaic street and Columbia avenue. The edifice will cost $100,000.

WASHINGTON, D. C.—Electricity will supplant the old system of gas lighting at the Capitol. Hereafter the House and Senate will receive their illumination from an electric plant which has just been installed.

NEW ROCHELLE, N. Y.—An effort is being made to organize a syndicate for the establishment of an electric light plant. J. Abel, of Neptune Park, and J. Wilkins, of Highland Park, are promoting the scheme.

ALLEGHENY, PA.—The new electric light plant which has been in course of construction for almost a year has been completed, and last night about 250 new lamps were burning.

OAKDALE, PA. — The Oakdale Electric Light, Heat and Power Company has been incorporated. Capital, $8,000.

WATERFORD, N. Y.—The contract for lighting the streets of this village by electricity has been awarded the Beacon Electric Light Company, of Lansingburgh.

ATLANTA, ILL.—Steps are being taken for the establishment of an electric light plant here.

LAKEPORT, CAL. — Clear Lake Electric Power Company has been incorporated by E. P. Clendenin, D. C. Rumsey, Lakeport; J. K. Fraser, Keysville; O. E. Moore, San Francisco; Richard Wylie, Napa. Capital stock, $2,000,000.

DANSVILLE, N. Y.—Dansville Gas and Electric Light Company has been incorporated by W. W. Cramer. Capital stock, $25,000.

DEL NORTE, COLO.—An electric light plant is to be established.

LINCOLN, NEB.—Lincoln Electric Light and Power Company has been incorporated by John St. Cerny, John A. Lutz.

SALT LAKE CITY, UTAH.—Salt Lake & Ogden Gas and Electric Light Company has been incorporated by W. S. McCormick, P. L. Williams, George M. Scott, L. S. Hills, Thomas G. Webber.

CAMDEN, NEV.—The Camden Water, Power and Light Company has been incorporated. Capital stock, $50,000. Frederick W. Paramore, Henry F. Muller, Edward S. Paramore, Charles Brown, incorporators. The purpose is to erect and operate plants for furnishing light, water and power.

ALEXANDRIA, P. Q.—An electric light plant is to be established here.

FLINT, MICH.—M. C. Barney put in an electric light plant in his factory.

DURAND, MICH.—An electric light plant is to be established here.

OROVILLE, CAL.—The Oroville Gas, Electric Light and Power Company recently purchased the old electric plant, and also a new dynamo from the Westinghouse Electric and Manufacturing Company, and men have been busy for several weeks rewiring the town under the direction of V. T. Lockwood. The purchasing of the old plant and installing the new will cost in the neighborhood of $10,000. This new system has reduced the expense of light one-half to the majority of the consumers. Arrangements are being made for street lights.

BATH, ME.—The Bath Iron Works will probably substitute electricity for steam.

NORTH WILKESBORO, N. C.—W. F. Trogdon is in the market for electric light plant.

NORTH TROY, VT.—An electric light plant is to be erected.

TRENTON, MO.—The electric light plant has been sold to Messrs. Eagen and Campbell, who will place the same in good condition.

EAST MAUCH CHUNK, PA.—A new $15,000 electric light plant is to be constructed.

ANTRIM, N. H.—The Goodel Company will increase its water power for the electric light plant on the Contoocook River at Bennington.

NORTONVILLE, KAS. — The Nortonville Electric Heat, Light and Power Company has been incorporated with a capital stock of $2,500.

UPPER ALTON, ILL.—An electric light plant is to be constructed. P. S. Webster, village clerk, can give information.

ATLANTA, IND.—The Atlanta Steel and Tin Plate Company has decided to light its works with electricity and desires correspondence with electric companies. The company intends to put in a 50-arc-light plant complete.

New Manufacturing Companies.

CAMDEN, N. J. — Philadelphia Electric Storage Battery Renting Company has been incorporated by Ebenezer Wood, Madison Rush, Philadelphia, Pa.; Wm. H. Casselman, Camden, N. J.; to manufacture storage batteries, dynamos, motors, etc. Capital stock, $300.000.

DANVILLE, VA.—The Dan River Power and Manufacturing Company has increased its capital stock from $750,000 to $1,000,000.

SACO, ME.—Gray's Electric Railway Supply Company has been incorporated by Robert Johnson and James R. Powers, Boston, Mass.; to manufacture rails, cars, apparatus for electric and other railways. Capital stock, $500,000.

LAFAYETTE, IND.—Lafayette Engineering and Electric Works has been incorporated by Charles S. Robertson, Henry T. Meigs, John C. Flathers, Edgar V. Burt, Samuel Moore, Lafayette; to manufacture electrical and steam machinery. Capital stock, $60,000.

KANSAS CITY, MO.—The Houston Electric Company has been incorporated by C. A. Ross, W. H. Blood and L. P. Boulelake. Capital stock, $10,000.

PHILADELPHIA, PA.—A charter has been granted to the Reed Electric Company; capital stock, $500,000. The directors are Amos W. Bacon and Carl Hering, of Philadelphia, and Marcellus T. Morrill, of Camden, N. J. There are 38 incorporators, the majority being from Philadelphia. The heaviest stockholders are C. J. Reed, 2,531 shares;

Stahl & Shaub, 2,531 shares, and Justus Straub, all of Philadelphia. At present this company is doing business in New Jersey, but it is now changed into a Pennsylvania corporation.

New Telephone and Telegraph Companies.

LOUISVILLE, KY.—The Postal Telegraph Company has opened offices at Paris, Cynthiana and Falmouth, and will soon have a line to Winchester.

NEW YORK, N. Y.—The Southern New England Telephone Company will shortly issue $150,000 additional stock, increasing the total amount to $1,650,000.

LAUREL, MD.—The telephone line between this place and Sandy Spring is now in operation. There are about six telephones in Laurel. The line between Sandy Spring and Laurel is 12 miles in length.

YOAKUM, TEX.—A telephone line has been put up from this place to Hochheim.

PITTSBURGH, PA.—The Central Telephone Company has let the contract for a new line from Girard to Hubbard, Ohio, and West Middlesex and Sharon, Pa. The line from Greenville to Jamestown will be improved by the placing of new poles.

ELIZABETH CITY, N. C.—A plan has been on foot here a long time to have a telephone system at this place, and it is to be hoped that it will succeed.

WEST POLAND, ME.—There is talk of a telegraph line between this place and Poland Corner. It is to be put in by Fernald, Keene & Company.

Business Troubles.

NEW YORK, N. Y.—Joseph Donaldson, manufacturer of gas and electric fixtures at 74 East Ninth street, made an assignment recently to Bernhard Ginsburg. His liabilities are reported to be $21,000 and his assets $20,000.

ASBURY PARK, N. J.—Ex-Assessor L. E. Watson has asked for the appointment of a receiver for the Asbury Park & Belmar Street Railroad Company.

BOSTON, MASS.—The American Electric and Manufacturing Company has asked for an injunction against the Thomson-Houston International Electric Company to restrain it from selling 359 shares of American electric stock.

Increase of Capital Stock.

PLATTSBURG, N. Y.—Plattsburg Light, Heat and Power Company has increased the amount of its capital stock from $100,000 to $125,000. The directors of the company include H. G. Runkle, G. M. Cole, H. E. Bullard and A. E. Reynolds.

CHICAGO, ILL.—Hyde Park Thomson-Houston Light Company has increased its capital stock from $100,000 to $125,000.

MANITOWOC, WIS. — The electric light company filed an amendment to its articles increasing its capital stock from $40,000 to $50,000.

New Haven, Conn., has taken up the subject of the taxation of street railroads, and a committee of the Board of Aldermen is said to be in favor of the project. The matter is to be discussed by the full board, and it is expected that the committee will be sustained.

ELECTRIC LIGHT FLASHES.

Charities Commissioner John H. Burtis is studying a plan to supply the Kings County, Brooklyn, N. Y., penitentiary with its own electric plant.

Electric street lights at York Corner, Me., have been discontinued for the season. Another year the wires will probably extend to York Beach.

Arrangements have been made to light the streets and public buildings of Marathon, N. Y., with electric lights. The expense as per contract is $75 per light.

Reading, Mass., has constructed, under the municipal lighting act, a complete electric plant and is now lighting that town. The complete cost of the plant was $62,000.

Ashtabula, Ohio, will not issue $12,000 in bonds to meet the indebtedness against her electric light plant. The circuit court issued a perpetual injunction against such action.

The electric light plant at Holton, Kas., will soon begin to supply light to the town. About a dozen Kansas towns have installed electric light plants during the present year.

An American firm of the City of Mexico has secured the contract for lighting the Mexican national palace by electricity. The government until recently has opposed putting in electricity, fearing danger from fire.

Jacksonville, Fla., is now lighted by 118 arc lights and 300 incandescent lights, from its own plant, and is furnishing to consumers 70 arc and 1,600 incandescent lights, making a total of 188 arc and 1,900 incandescent lamps in use.

W. G. Decelle has commenced injunction proceedings against Elihu Coleman, of Fond du Lac, Wis., and H. F. Whitcomb, of Chicago, restraining the former from transferring to the latter the Fond du Lac electric light, power and railway property.

The Metropolitan Electric Light and Power Company are placing motors in the Acme Bicycle Works, Reading, Pa., to take the place of their engines. It is the intention of the firm to run their works with electricity instead of steam as heretofore.

The Kearney, N. J., Electric Light and Power Company, which was organized this year for the purpose of supplying street lights, has made a contract with the town of Belleville to light the streets of that place. The electric current will be carried across the river in a heavy cable.

The Minersville, Pa., Electric Light Company are making extensive improvements to their plant and will expend in the neighborhood of $5,000. They have ordered one engine which will not only be large enough to run a great many more incandescent lights, but also give sufficient power for arc lights.

J. Q. Howe & Son, who were awarded the contract for lighting the streets in the village of Phelps, N. Y., by electricity, state that they are losing money and ask for an increase of the price paid for the service. It is stated that unless a concession is made to them they will forfeit their bond of $1,000 and abandon the contract.

The project for the introduction of a system of electric lights at the Government Hospital for the Insane, at Washington, D. C., includes the establishment of two plants. The larger of these will be a 200-horse-power compound Armington & Sims engine, a pair of General Electric multipolar dynamos, in series, for the three-wire system. The smaller plant will be a 100-horse-power Armington & Sims compound engine and a pair of General Electric multipolar dynamos, in series.

Beacon Lamp Company.

Mr. Eugene McQuat has been appointed superintendent of the Beacon Lamp Company's factory, Irvington street, Boston. Mr. McQuat entered the electrical field in 1880 with the old United States company and in 1888 was connected with Prof. Edward Weston at Newark, N. J., since which time he has been with the Beacon Lamp Company. During all this time he has been actively engaged in the manufacture of incandescent lamps. The Beacon Lamp Company report that business has never been better with them than at the present time.

Thomas Wallace, Jr., of St. Paul, Minn., has sued the Carpenter Electric Heating-Manufacturing Company and American Electric Heating Corporation, that the individual liability of latter for unpaid installments on the stock of the former company may be ascertained.

Second-Hand Engines and Boilers For Sale.

Two 9½x10, double, 125 horse-power, Armington & Sims.

One 15x20, 150 horse-power, Ide.

One Boiler, 66 in. diameter and 16 ft. tubes.

Two 50-light Westinghouse Alternating Arc Machines with lamps. An excellent factory installation.

All in good order and condition. Only for sale on account of being replaced by larger units.

Also a lot of Dynamo Pulleys; prices on receipt of dimensions.

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New Bedford, Mass.

MESCO DRY BATTERY.

A standard battery for all open circuit or intermittent work. Highly recommended for Telephone Transmitters.

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QUICK AND SLOW BRAKE.
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"PONY" Switch. 15, 25 and 35 Amp.

THE FIBERITE CO.,
Mechanicville, N. Y.

"A-B" Arc and Incandescent LAMPS "A-B"
IRON HANGER BOARDS.
ADAMS-BAGNALL ELECTRIC CO., 47 E. PROSPECT ST., CLEVELAND, O.

ELECTRICAL PATENTS

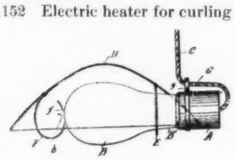
ISSUED NOVEMBER 5, 1895.

549,094 Brake for electric or other cars; E. S. Amrock, Waltham, Mass.

549,132 Electric arc lamp; F. Jehl, Vienna, Austria.—Consists of a carbon rod or electrode of an arc lamp, a quiescent or stagnant gaseous envelope surrounding and extending along said carbon to the point or face from which the arc emanates.

549,136 Street car lighting; F. E. Kinsman, Plainfield, N. J.

549,152 Electric heater for curling irons; G. D. Pogue, Jerseyville, Ill.—Consists of a heating coil and a metallic core together with a support for the reception of the irons and both the coil and the support in the same circuit, the irons making the circuit.



No. 549,201.—INCANDESCENT LAMP REFLECTOR.

549,153 Controlling electric motors; W. B. Potter, Schenectady, N. Y.—The art of controlling electric motors by the three-wire system, which consists in connecting two motors between an outside main and the neutral, and then connecting them between the two outside mains, preserving the connection to the neutral between the two motors.

549,162 Electric switch; J. B. Smith, Manchester, N. H.

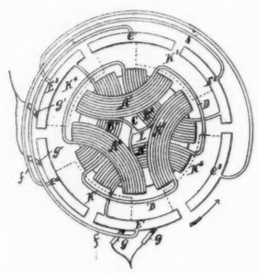
549,169 Thermostatic regulator; H. A. Tobey, Toledo, Ohio.

549,179 Printing telegraph system; J. E. Woodbridge, Duluth, Minn.—A printing wheel having two rows of type and a motor, a shift magnet for shifting the printing wheel lengthwise of its shaft and a series of interlocking stop mechanisms having each a controlling magnet, whereby the point of arrest of the wheel is determined.

549,186 Electrolytic apparatus; T. Craney, Bay City, Mich.

549,189 System of electrical distribution; W. M. Fairfax, Brooklyn, N. Y.—Consists in supplying current to a number of groups of devices in succession, and maintaining the potential constant in each of said groups by generating a counter electromotive force in derivation to each group, and varying said counter electromotive force by the varying current in the respective group.

549,195 Electric meter; R. O. Hood, Danvers, Mass. — Consists of an electric motor placed in the circuit to be measured, means for stopping the revolution of the motor at regular intervals of time, and a device for recording the revolutions of the motor.



No. 549,234.—ARMATURE.

549,201 Incandescent lamp reflector; C. J. Klein, New York, N. Y.—A reflector having means for engaging the neck of the shade and a spring for firmly retaining the reflector in place.

549,209 Electro-magnetic switch; C. L. Penny, Newark, Del.

549,234 Armature for dynamo-electric machines or motors; W. Decker, Owego, N. Y.—In a machine whose poles are four, or a multiple of four, and armature winding composed of two groups of coils, the one group of coils differing only in length from the other group of coils, and these coils being connected electrically in sets of one or more short coils in series with an equal number of long coils whereby all are counterpart sets.

549,237 Electric switch; G. W. Hart, Hartford, Conn.

549,240 549,241 Electrical annunciator; R. L. Hunter, Minneapolis, Minn.—Consists of one or more call indicators and a want indicator operative conjointly and simultaneously by any one of several circuit closers, and a common recording mechanism operative by the breaking of the indicator circuit.

549,254 Method of making insulator rings; C. F. Peterson, Schenectady, N. Y. — Consists in bending pieces of mica, assembling them to form a determined shape, cementing them together as the regular structure is built up, subjecting said structure to pressure and heat and chilling the same.

549,268 Arc cut-out; C. D. Haskins, Newton, Mass.—Terminals combined with a spring actuated toggle lever, the springs and lever arms whereof form a part of the main circuit.

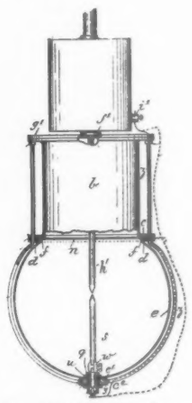
549,304 Telephone; S. Alexander, Hartford, Conn.

549,346 Transmitting time signals; C. E. Buell, Plainfield, N. J.

549,383 Automatic regulator for converters of energy; W. E. Moore, Augusta, Georgia.

549,409 Electric arc lamp; C. F. Vogelius, Bloomfield, N. J.—Consists of a globe having the top normally connected with the case, a vertically sliding yoke embracing the globe and inserted through perforations in the globe flange and case flange.

549,416 Insulating rails; F. W. Wilson, New York, N. Y.—An insulating bed for railroad rails comprising a non-conducting or insulating base plate of greater width than the rail base with connecting devices for the rail flange.



No. 549,409.—ARC LAMP.

549,443 Electric supporting insulator; J. Collins, Washington, D. C.—An insulator having rectangular faces and in each a groove to support a wire.

549,449 Apparatus for indicating differences of phase; M. von Dolivo, Berlin, Germany.

549,456 Carbon contact resistance switch; F. G. Meyer, Germany.—A vertical rocking lever carrying two horizontal arms, adapted to be engaged by said horizontal arms, movable refractory contacts carried upon said slide and stationary refractory contacts adapted to be successively engaged by said movable contacts.

549,464 Electrical dental engine; F. C. Priestly, Denver, Colo.

549,470 Electrical resistance; H. E. Werline, Lancaster, Pa.—Consists of lapping filaments connected to form a continuous conductor, the electrical resistance of a portion of said conductor varying in a direction opposite to that of another portion thereof under changes of temperature and non-conducting walls interposed between the lapping filaments.

549,477 Local transmitter circuit for telephones; W. W. Dean, St. Louis, Mo.

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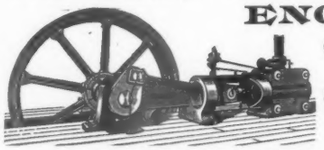

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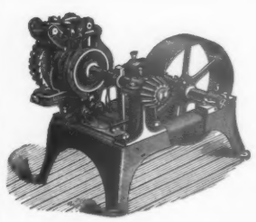

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